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The Macintosh™ Magazine



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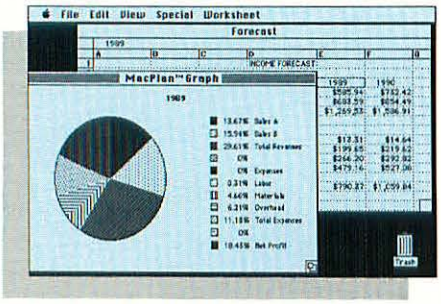
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SideKick: The Desktop Organizer, Release 2.0

Thousands of users already know that SideKick is the most complete and comprehensive collection of desk accessories available.

Well, with Release 2.0, the best just got better. We've just added two powerful high-performance tools to SideKick. We've added Outlook: The Outliner and MacPlan: The Spreadsheet. They work in perfect harmony with each other and while you run other programs!



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SideKick: The Desktop Organizer, Release 2.0 now includes

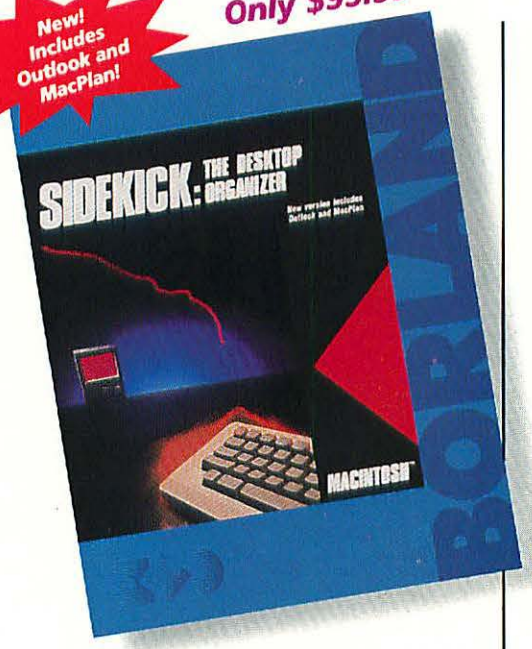
- ☑ Outlook: The Outliner
- ☑ MacPlan: The Spreadsheet
- ☑ Mini word processor
- ☑ Calendar
- ☑ PhoneLog
- ☑ Analog clock
- ☑ Alarm system
- ☑ Calculator
- ☑ Report generator
- ☑ Telecommunications (new version now supports XModem file transfer protocol)

Upgrade Now! *If you are one of the thousands of SideKick users, just send us your original master disk back with a check for $34.95, and we'll rush you a brand new SideKick, Release 2.0, complete with manual.*

**Introductory offer expires July 1, 1987*

New! Includes Outlook and MacPlan!

Only $99.95*



Outlook: The Outliner

- *It's the desk accessory with more power than a stand-alone outliner*
- *A great desktop publishing tool, Outlook lets you incorporate both text and graphics into your outlines*
- *Works hand-in-hand with MacPlan*
- *Allows you to work on several outlines at the same time*

MacPlan: The Spreadsheet

- *Integrates spreadsheets and graphs*
- *Does both formulas and straight numbers*
- *Graph types include bar charts, stacked bar charts, pie charts and line graphs*
- *Includes 12 ready-to-use templates free!*
- *Pastes graphics and data right into Outlook creating professional memos and reports, complete with headers and footers, in a snap*

New Version!

System requirements:
Macintosh 512K or Macintosh Plus with one disk drive.

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MacUser EDITOR'S CHOICE AWARD

Reflex: The Database Manager— MacUser Editor's Choice Award

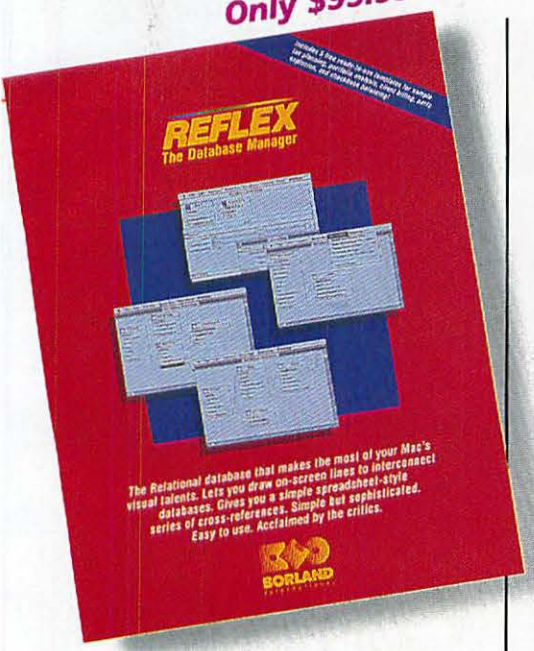
System requirements:
Macintosh 512K or Macintosh Plus with one disk drive.
Second external drive recommended.

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. . . a powerful relational database . . . uses a visual approach to information management that makes this power easy to manage. **InfoWorld**

. . . a combination of power and flexibility that distinguishes it from any other product we've seen. **Esther Dyson, Release 1.0"**

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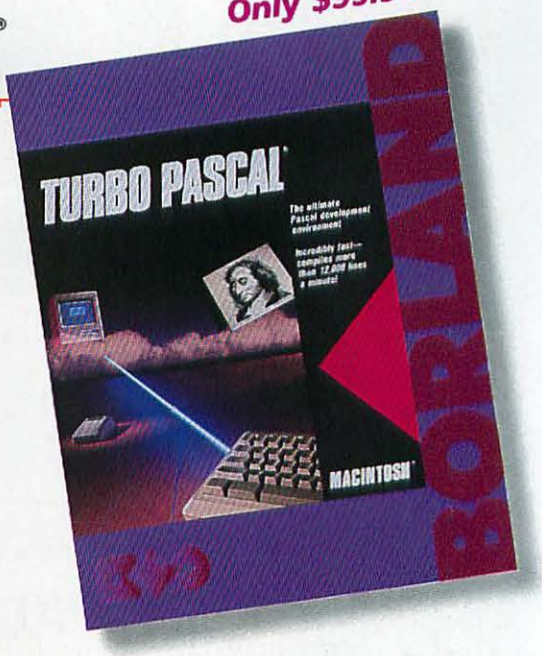
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- ☑ *No need to switch between programs to compile or run a program*
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- ☑ *Compatible with Macintosh Programmer's Workshop Pascal (with minor changes)*
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Robert Forras, MacTimes

Turbo Pascal is already an industry standard in the IBM-compatible world and we're very excited to see Borland International's new commitment to provide this and other modestly-priced, high-quality software for the Macintosh computer.

John Sculley, Apple Computer, Inc."

System requirements:
Macintosh 512K or Macintosh Plus with one disk drive. (The complete Turbo Pascal package, including compiler and editor, occupies only 50K of memory.)

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MACWORLD

April 1987

The Macintosh™ Magazine



On the Cover

The ray-cast image displayed on this Macintosh II was created on a Cray supercomputer by Apple's Mike Potel and Jim Batson. For a behind-the-screens look at Mac II graphics, see p. 126. (Photo by Paul Franz-Moore.)

Departments

13 **Mac Bulletin**
Late-breaking news.

21 **David Bunnell**

31 **Letters**

47 **Commentary/Jerry Borrell**

54 **Contributors Notes**

61 **Steven Levy**

85 **Verbatim**
Apple chief operating officer Del Yocam on the new Macs.

177 How To/**Quick Tips**
Screen savers, rounding in BASIC, direct LaserWriter hookup, and more.

187 How To/**Getting Started with Telecommunications**
The whats, whys, and hows of going on line.

199 How To/**Insights on Red Ryder**
Communicating tips and a look at the latest upgrade.

205 How To/**Mac Desktop Tools**
Finder shortcuts and strategies for clearing desktop clutter.

215 How To/**Mac Troubleshooting Tools**
Quick fixes for common glitches.

222 **Updates**
Keep up with Mac software upgrades.

235 **Where to Buy**
Information on products in this issue.

246 **Best-Sellers**

109 Macworld News

▪ *Desktop Presentations* A mass market waiting to be mined?

▪ *Project Victoria* Pac Bell pioneers a new communications concept.

▪ *Supercomputers* Macs as Cray terminals.

▪ *Graphics News Services* A new Mac wire service from the *Chicago Tribune*.

Plus, reports on *RésuméWriter*, the world's largest Mac peripheral, advertising on disk, doings in the Mac factory, and more.

Features

Special Reports:

126 **Macintosh II: Opening to the Future**
The new master Mac silences the critics with expansion slots, color, bigger screens, a 68020, and more.

140 **More than a Plus**
It may look familiar, but the Mac SE is an all-new machine inside.

144 **An Open Forum**
An overview of Apple's biggest rollout ever.

150 **Filling the Slots**
Make the most of the new Macs with expansion cards, peripherals, and other third-party products.

156 **April Fooleries**
Utilities with no utility—a grab bag of public domain pranks, jokes, and diversions.

Reviews

160 **Two Minds in One**
MindWrite word processor.

162 **Turbo Pascal Arrives**
Pascal compiler.

163 **Just Between Formats**
MacLink Plus file conversion.

164 **A Porsche among Mac Disks**
DataFrame 40-XP hard disk.

165 **Where the Wild Buffalo Roam**
Great Plains Accounting Series.

167 **Professional C**
Aztec C development system.

168 **A Consumer's Guide to Disk Carriers**
Wallet, easel, and portfolio.

170 **White Space and Black Bars**
PC-380 and TimeWand bar code readers.

171 **Tomb It May Concern**
Arazok's Tomb adventure game.

172 **Arithmetic Explosion**
Math Blaster educational game.

173 **Shareware Communications for the Mac**
MockTerminal, FModem, TermWorks.

174 **Home-Baked, but Pre-Cooked**
The Print Shop stationery printing.

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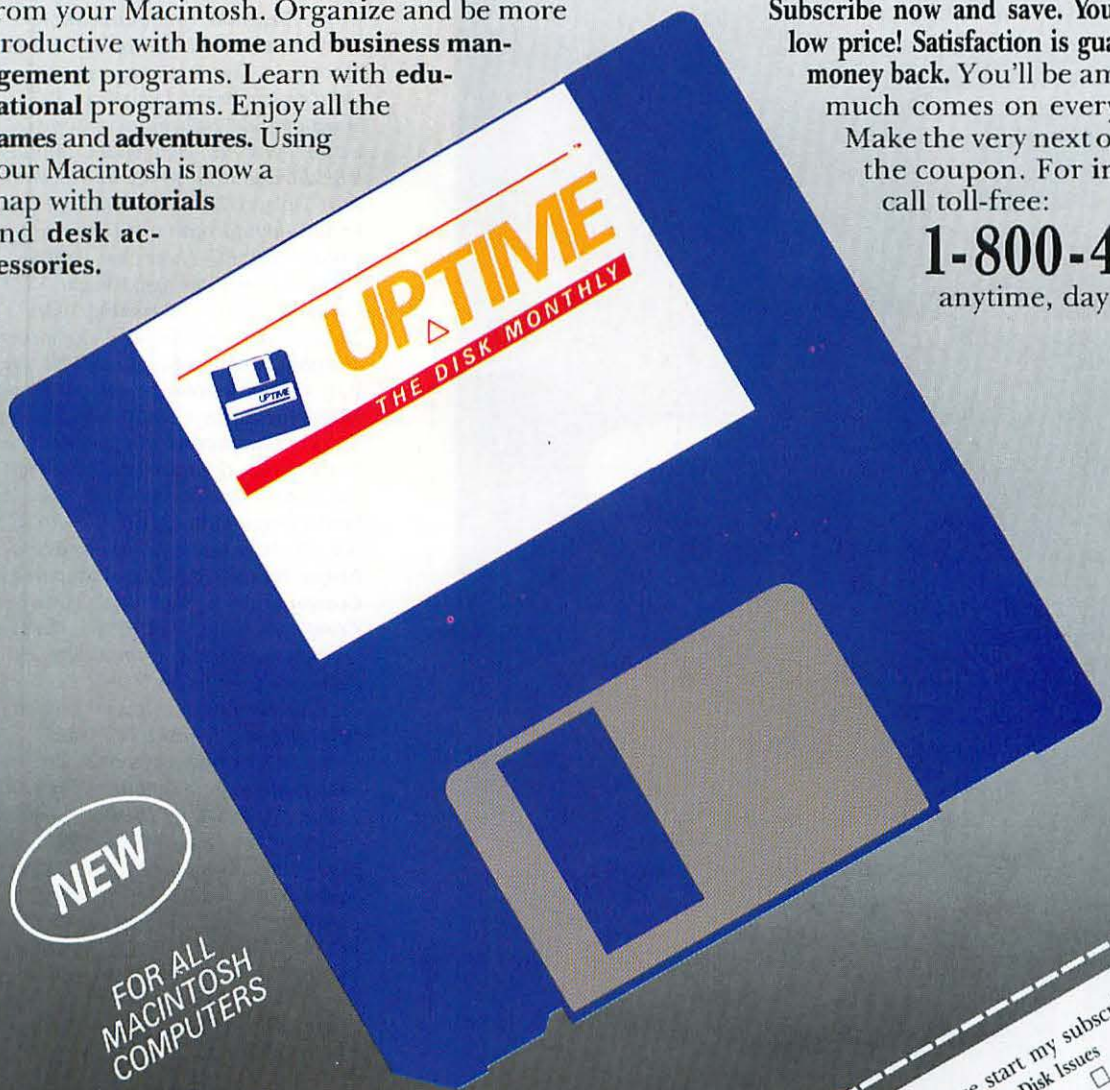
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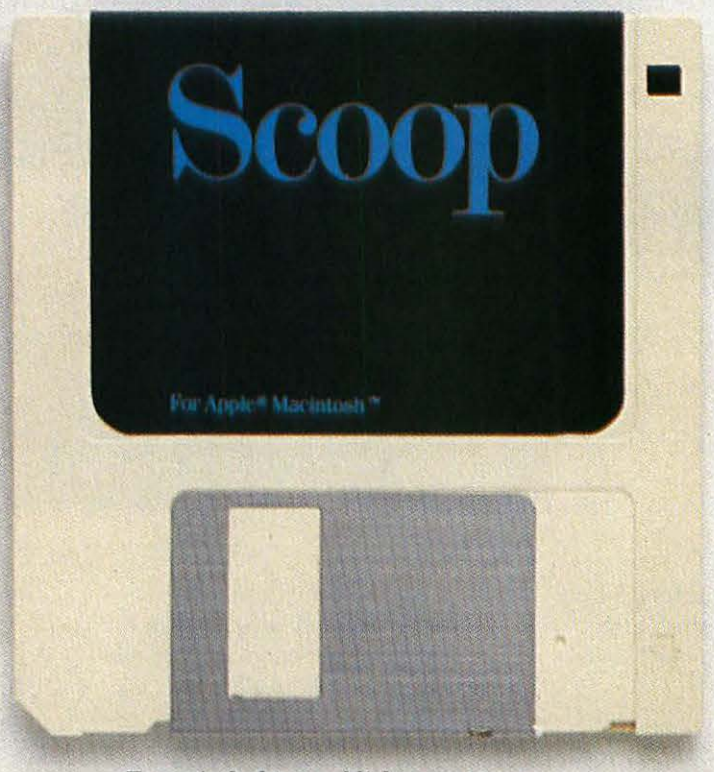
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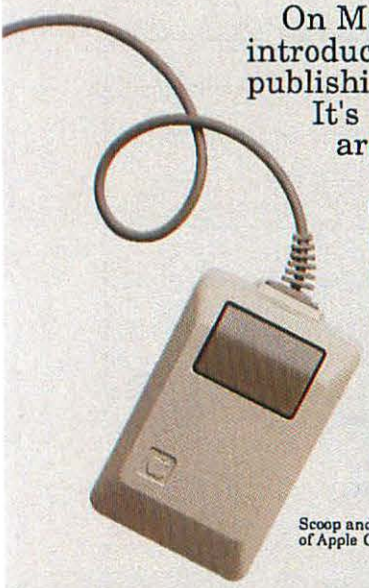
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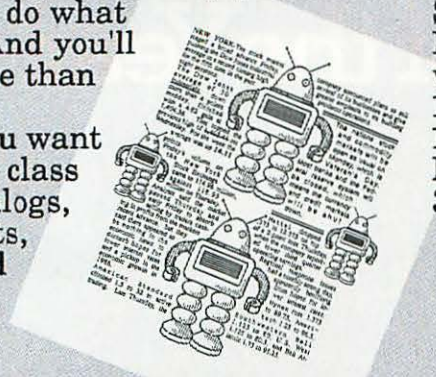


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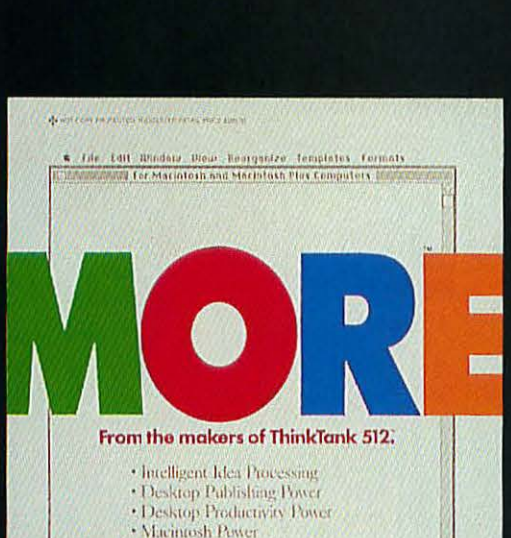
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Mac Bulletin

Word Processing Goes Hollywood

Adding to the variety of word processing options, two companies have introduced scriptwriting software and accompanying storyboard and production-planning aids. For $495, *ScriptWriter* by American Intelliware of Torrance, California, offers synchronized dual-column editing (with independent column formatting) plus other script formats and such features as automatic scene numbering and dialogue placement. Also from American Intelliware for $495 is *Storyboarder*, a related drawing program for planning the visuals that bring a script to life. Specialized tools include transition effects, such as dissolves, fades, and wipes, as well as animation features. Each image in the storyboard panel is recorded in a spreadsheet to facilitate editing, reordering, and time-coding.

And a couple of French imports have arrived on the scene, marketed in the United States by a firm called Max III (213/276-7682): *CineWrite* ($495), a scriptwriting program that incorporates storyboarding features, including the ability to play back images in real time to preview the finished production, and *CineMac*, a production management program.

CAD Advances

Now the IGES format used by mainframe CAD programs is coming to the Mac. Micro CAD/CAM's new *MGMS Professional CAD for the Mac* supports IGES, and Enabling Technologies of Chicago is putting the finishing touches on IGES and ASCII translator programs that work with *Pro3D* and *Easy3D*.

MGMS, from the Los Angeles-based firm, retails for $799 and includes Cartesian, absolute, incremental, and polar measuring systems. It offers specialized drawing tools such as fillets, splines, and sections, 10 ways to create a line, 12 ways to define circles, rotation by thousandths of a degree, and up to 64 layers. There's also a library for storing symbols and drawings.

Save Your Memory

A power failure in a roomful of computer users—even a roomful of programmers—is sure to trigger a sudden chorus of moans and expletives. We can all remember getting so wrapped up in work or distracted by a phone call that we forgot to save said work before disaster struck. Magic Software of Bellevue, Washington, produces a $20 desk accessory, *AutoSaveDA*, that automatically saves to disk at regular intervals, sparing the human user's memory for loftier tasks.

Solid Drawing Tools

EDO Communications, maker of *LaserWorks*, has introduced a PostScript drawing program called *LaserPaint*, the latest entry in a new wave of software that does away with the jaggies in Mac images. Adobe Systems itself was the first to announce its PostScript graphics program, *Illustrator*. And Cricket Software has launched *Cricket Draw*. The next wave? Look for other applications, such as page-layout programs, that import the 300-dot-per-inch PostScript images produced by these new programs.

User Groups Meet

Representatives of Apple user groups will gather for a national meeting in Dayton, Ohio, April 10 to 12, in a conference cosponsored by Apple Computer's User Group Connection. For more information contact M.L. Arons (513/293-0551) of the Apple-Dayton user group, which is hosting the event.

Matchmaker Marketing

Last month we reported that a slew of new graphics scanners are being bundled with Silicon Beach's *SuperPaint*. Now AST Research has announced that each of its four modems for the Mac (ranging from $499 to $1899) comes with a copy of Dennis Brothers' communications program, *MicroPhone*. Bundling is a great way for software publishers to strengthen the position of their products, keeping an edge on new competitors, but is this a trend? At AST, at least, it probably is; the company plans to package software along with a forthcoming peripheral product for the Apple IIGS, and it's looking for more dynamic duos for the Mac.

Taking Stock

As the price of Apple stock rose toward its year-end high of $40.50, up 84 percent from the close of 1985, company head John Sculley made a highly publicized sale of 107,000 shares for $4.25 million. A bad omen? Not according to Apple spokesperson Marianne Lettieri, who said Sculley still holds 3777 shares and options to buy 392,000 more. Apparently the CEO and other Apple executives exercised their once-every-six-months option to sell at a profit before the higher 1987 capital gains tax took effect.

Desktop Engineering

MacNeal-Schwendler Corporation (MSC), a major supplier of engineering software for the IBM PC, engineering workstations, and mainframes, has announced *MSC/pal*, an engineering analysis program for the Mac. Applications include design and analysis of mechanical systems, stress analysis of mechanical components, servomechanism vibration analysis, stress analysis of pressure vessels, vibration analysis of printed circuit boards, automotive and aerospace structural-strength analysis, and machinery vibration analysis. Because of the large number of Macs in colleges and universities, MSC offers a special version of the program for the educational market.

(continues)

Big Screen on a Budget

An innovative $95 program lets you break through the Mac's window barrier and move around at will in your document, no matter how large it is, without using scroll bars. *Stepping Out* from Berkeley Design Systems of Berkeley, California, simulates a big-screen monitor with a user-definable display size, and the Mac screen becomes a peephole into that expanse of work space. The program can simultaneously show actual-size and thumbnail versions of your document on screen, with an active cursor in each version. You can also zoom in on your work with 15 levels of magnification that provide a big-type version of the Mac display.

Scrabble

Electronic Arts of San Mateo, California, has brought out a Mac version of *Scrabble*. This version of the classic word game sells for $39.95.

Your Basic Big Screen

Micrographic Images of Canoga Park, California, has streamlined its original big-screen product into a cheaper—$2495—MegaScreen II. It's basically the same 19½-inch, monochrome, high-resolution monitor, but with a single video signal and fewer options than its predecessor. The original, now called the MegaScreen Plus, is still available; it comes with a power supply and a fan and produces a second video signal that conforms either to NTSC or PAL standards. A 68881 coprocessor and a 20MB internal hard disk are optional on the $2995 MegaScreen Plus.

Bigger Is Better?

The big news in mass storage this year: more of it. The realm of hard disk drives and tape drives (and combinations of the two) was the most crowded product category at the January Macworld Expo, with a bewildering array of product lines from AST Research, CMS Enhancements, General Computer, Jasmine, Kamerman Labs, Mirror Technologies, Peripheraland, Relax, Rodime, Sunol, and SuperMac Technology.

New this year are SCSI behemoths tilting the scales at more than 100 megabytes of storage, such as AST's hard disk/tape backup combo that comes in 120MB, 240MB, and 320MB sizes (from $7995 to $11,995); CMS's 140MB ($3995), 240MB ($4995), and 320MB ($6495) drives; Mirror's 340MB drive (just over $10,000); Sunol's 245MB drive that comes with a multiuser disk-server interface ($7695); and LoDown's write-once-read-many (WORM) optical disks in 400MB and 800MB sizes. Other new wrinkles: Personal Computer Peripheral Corporation's MacBottom SCSI hard disk with optional built-in Hayes-compatible modem and Bering Industries' drives using Bernoulli technology in 5¼-inch removable cartridges. SuperMac has also announced new fault-tolerant software for its XP40 drive that is meant to protect the data on the disk from crashes of application and system software; it will go out as a free software upgrade for XP owners.

DTP Templates for Books

McCutcheon Graphics of Toronto offers desktop publishers and traditional publishers a shortcut to book production: 50 design templates created in FTL's *MacTex* that take edited *Microsoft Word* book manuscripts and automatically design and create the pages in a matter of hours instead of weeks. Called *Page One,* the $2000 package produces final printouts on any PostScript printer, from the LaserWriter to high-resolution typesetting equipment such as the Linotronic 300.

Four-Megabyte Macs

Four megabytes for under $1000—now that's the ticket. But in the meantime, memory chip prices are declining and memory upgrade pricing for the Mac is becoming more affordable. Dove Computer is selling the Plus 4H, a 4MB SIMM memory board utilizing 1-megabit CMOS chips for $1999, but with dealer discounts you can get the board for as little as $1300. MacMemory's MaxPlus 4-Pak, a 4MB upgrade consisting of 1MB of 256K chips and 2MB of 1-megabit chips, a fan, and MaxSave, is priced at $1149.

Three-Way File Sharing

CMS Enhancements of Costa Mesa, California, has announced Data Exchange, a new system that will allow Macs to share files with Apple IIs and IIGSs as well as IBM PCs. Files from the different machines are stored in separate partitions of the Data Exchange hard disk; a utility translates data among the operating systems. The system allows you to use all the computers together. For example, you might take data from a *1-2-3* spreadsheet, transfer it to an *Excel* worksheet, extract some figures to combine with a word-processed document from an Apple II, and lay it out in *PageMaker* on the Mac before laser-printing it. The Data Exchange disk connects to the Mac via the SCSI port, and it requires a SCSI adapter and an expansion card for connected IIs and PCs. CMS will market three models of the subsystem: a 20MB subsystem with a 65-millisecond access time ($995), a 40MB with the same access time ($1595), and a 40MB with a 29-millisecond access time ($1995).

Upgrade for Taxes

Just in time, Monogram has released an upgrade of its financial-management program, *Dollars and Sense,* which exports data into the *MacInTax* version for the 1986 tax year.

Sun Outbids 3Com for Centram and TOPS

At press time, Sun Corporation, maker of 68020-based workstations, announced it had signed a letter of intent to acquire Centram Systems West, developer of the popular Mac network software TOPS. The Sun announcement supersedes a previous bid for Centram by 3Com Corporation. □

See what you've been missing.

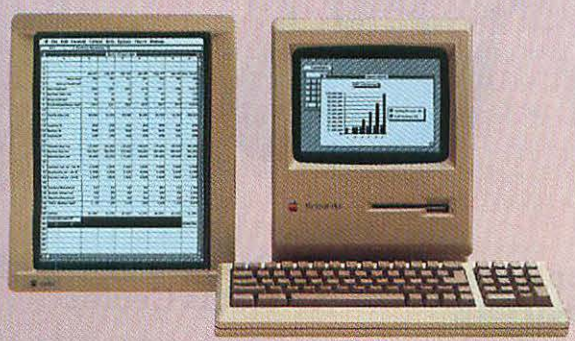
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How to dramatically improve the way you manage meetings, ideas, time and people with MORE.™

If you're like most people your time is valuable. You believe you should, and could, be more effective managing your daily tasks. Perhaps you've even tried conventional methods of increasing efficiency—making lists of priorities, delegating, keeping diaries, etc.—only to find little has changed because you're still wasting valuable time.

That's why we wrote this guide. We want to explain four ways to improve the way you work by using the power of MORE and a Macintosh.

If you're too busy to read further, please skip ahead to the coupon and see how easy it is to receive our free time-saving booklets on ***Managing Meetings, Preparing Business Plans, Creating Tree Charts*** *and* ***Organizing a Status Center.***



What's different about this meeting? The Macintosh on the table is running MORE. With MORE in the meeting, ideas will be focused and presented better than ever before possible.

1 Start a revolution at your next meeting.

How often do you come away from a meeting satisfied with the results? Probably not as often as you would like. Here are some simple ways to get more accomplished at your next meeting:

- Have a specific objective in mind; as the meeting progresses, be sure you're still dealing with the same problem.
- Only cover things that cannot be put across in other ways—bulletins, manuals, direct contact with supervisors, etc.
- Don't try to cover more ground than time will permit. You can't solve the world's problems in a 30-minute staff meeting.
- Prepare for the meeting. Find out what the other people attending need to know before the meeting.

Why MORE is so revolutionary in meetings.

Try taking a Macintosh and MORE into your next meeting. Start with an outlined agenda, develop the issues into a group action plan. The participants—even those who don't use a computer—can direct the content and organization of the plan. Graphic Tree Charts and Bullet Charts help you present the impact of your decisions. At any point, you can review what's been accomplished. Everyone gets a uniform set of meeting notes, on disk or printed. This frees the participants from having to take detailed notes. Everyone knows what was decided, so next time you sit down there won't be a debate. Spreadsheets started a revolution for people who work with numbers. MORE is starting a revolution for people who spend time in meetings.

2 Manage people and projects effectively.

Managing people and projects can be very difficult. Some managers apply common sense, others learn by doing, others simply avoid the problem altogether. In an effort to simplify a complicated subject, here are a few things that will help any manager:

- Managing requires a great deal of talking and listening. It sounds easy, but it is a constant job that requires a concentrated effort.
- Job descriptions and boundaries should be provided for every person's job.
- Feedback on performance and encouragement improve motivation. Doing and saying nothing leads to stagnation.
- Find the best people you can and support them.

Now there's a way to manage people and projects better using MORE. Managers, executives, corporate planners and personnel staff can use MORE to outline their management ideas and instantly transform them into a Tree Chart. You can use Tree Charts for organizational charts, project flowcharts, decision trees, block diagrams or time lines. MORE also is a powerful tool for writing job descriptions and preparing employee reviews. As a project management tool, MORE is fast and flexible.

3 Create a time-saving Status Center.

The first step in becoming more time-efficient is to identify how you spend your time. Naturally, once you've figured how and why time is spent, you begin to do things that give you higher payoffs and more satisfaction.

For you, MORE becomes a convenient and powerful electronic notebook and card file. You collect and organize the details of



The next best thing to having a clock that runs backwards is having a Macintosh that runs MORE. With MORE you can set up a Status Center to organize the details of your daily work.



Some of the best ideas you have don't always happen in front of a computer. (That could change after you've used MORE.) For example, you can take your ideas from scraps of paper to a finished presentation in minutes.





daily work in an outline—your personal Status Center. You keep this outline up-to-date, using it to:

- List and organize your tasks
- Record names, addresses and phone numbers
- Keep your daily calendar
- Write and file notes and memos
- Track your expenses

MORE's power outlining lets you change and interconnect your lists with ease. You can use the Templates feature to store "boilerplate" such as an address form and call it up at any time. The calendar feature will generate a daily schedule automatically. Most of your writing and word-processing work can be done right in MORE. You can even dial a phone, record the time and date, and calculate a sum—all by pressing a key. MORE is the ultimate tool for desktop productivity.

4 Process your ideas, then present them.

If you've ever had to prepare a presentation in a hurry, you know how frustrating and time-consuming the task can be. Technique is an important part of presenting your ideas effectively. Here are some simple steps that will take you from rough ideas to finished presentations:

- Make a "laundry list" outline of basic ideas.
- Become uninhibited with your ideas—don't edit on your first pass.
- Be generous with headings, call-outs, charts and illustrations.
- Allow yourself the flexibility to change your presentation, even at the last minute.

Now you can prepare a presentation quickly and professionally, even at the last minute. For the first time, MORE integrates idea processing with idea presentation. You can outline your ideas and quickly transform them into attractive Bullet Charts. Add Tree Charts and pictures, and you have a full-fledged slide show. MORE is ideal for the entrepreneur writing a business plan—and also for anyone who develops presentations: managers and decision makers, executives, corporate planners, sales staff, educators.

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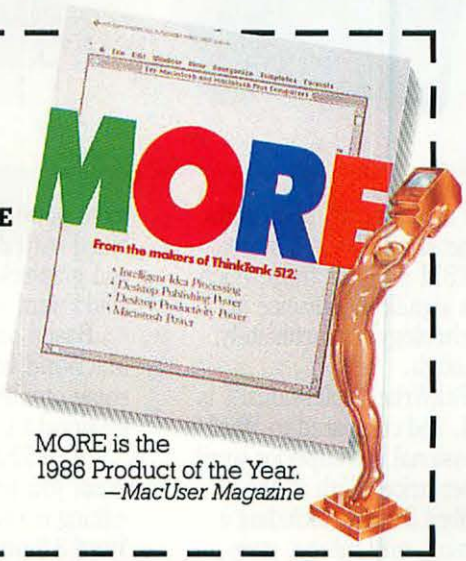
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Simply put, FullWrite Professional is the most powerful word processor available, combined with desktop publishing layout features and graphics generation. Everything you could want and can't get with Word 3.0.

Based on information released at the 1987 MacWorld Expo in San Francisco, here's some of what you'll get with FullWrite Professional that you won't get with Word 3.0.

- *WYSIWYG multi-column display.* What you see on the screen as you're editing is everything that prints on the page. Word 3.0 makes you switch out of the editing mode to see what you'll get. And unlike Word 3.0, all special features (endnotes, etc.) are displayed as you type.
- *Automatic repagination as you type.* Not the slow, cumbersome exercise of Word 3.0.
- *Full desktop publishing look.* Automatic wrapping of columns of text around any shaped object. And multiple column sizes on one page.
- *A MacDraw™-like drawing environment* with laser resolution bit maps. No changing programs or disks to create or edit graphics right in the page you're working on.
- *Hyphenation as you type.* Word 3.0 makes you manually initiate hyphenation after you've entered text.
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Turbo Mouse turns mouse technology upside down. It puts the mouse ball on top, rather than on the bottom like a standard mouse. You move only the mouse ball, not the whole mouse. That's why Turbo Mouse is quicker, quieter, and easier to use.

Turbo Mouse doesn't get its speed only from this ease of use. It has an automatic acceleration feature that senses the speed at which you are working and moves the cursor further when you move the mouse ball faster.

Turbo Mouse has two mouse buttons - one for right-handed users and another for lefties. And, since it's only 4" x 6", Turbo Mouse will fit neatly at the end of your keyboard.

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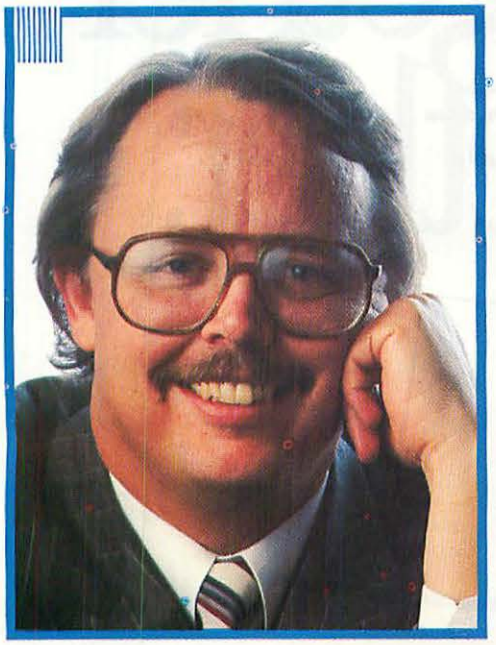
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David Bunnell

Neuromancing the PC



Guess what happens when the hackers grow up and the AI combines take over? Meet Cyberpunk, the Neurohacker of the future.

Last fall, I happened to bump into Dr. Timothy Leary at the Hackers 2.0 conference in the wooded hills of Saratoga, California. There, in that pastoral scene, I asked Leary what he was up to. He replied that he had started his own software company called Futique (the opposite of *antique,* get it?), and that he was under contract with the software game company Activision to make three "mind movies" based on the William Gibson cult novel *Neuromancer,* which is also being produced as a film.

First the book, then the mind movie, and then the movie movie? I must admit, I wasn't inclined to take Leary seriously at first because of his reputation as the acid king of the sixties.

I had never met the good doctor before, and I hadn't yet read Gibson's *Neuromancer,* but as I listened to Leary explain his mind movie concept, I became more and more impressed.

It's apparent that his game represents a radical departure in the genre of interactive software entertainment. The central idea is that you, the player, become the producer and director of your own film–or mind movie–based on the *Neuromancer* book.

The mind movie will feature eight acts comprising 128 scenes, which the player can design and redesign. You choose the type of production: blockbuster, art movie, or documentary, for instance. Then you set the budget, pick the cast (from a selection of real-life actors and personalities, including Dennis Hopper, Grace Jones, Sean Penn–even Gordon Liddy), decide the story line, plan a marketing campaign, design the movie posters, and eventually release the film to algorithm-generated critical reviews.

Finally, you get to view the result of all the interactive choices you've made. After you've completed the game (it takes 2 to 10 hours), you can hit a screen mode and then sit back and watch 5 to 15 minutes of graphics and text scenes. Dig into your popcorn and enjoy your very own Mac film noir or software slapstick.

But what is it that makes Leary's mind movie so different from other interactive games? "The star of most games is either the plot or the technology, but the star of this game is style," says Activision's director of product development, Brenda Laurel, widely regarded as one of the most scholarly and sophisticated producers for the home market. "In the last couple of years, the American public has come a long way toward understanding what style is. A trivial example of this is 'Miami Vice.' MTV has done a lot, too. Suddenly, style is a tangible thing to people who would never have used the word a few years ago. Culturally, this is the right game to be doing at this time."

As if to underscore this commitment to high style, Leary's *Neuromancer* software was a major production in itself. It involved the work of four writers, including prominent literary figure William S. Burroughs, as well as several technical experts–among them Kevin Piette, coauthor of *MultiMate,* Jojo Jansen, one of the programmers for *NFL Challenge,* and Mickey Wozniak, director of project management at Ashton-Tate.

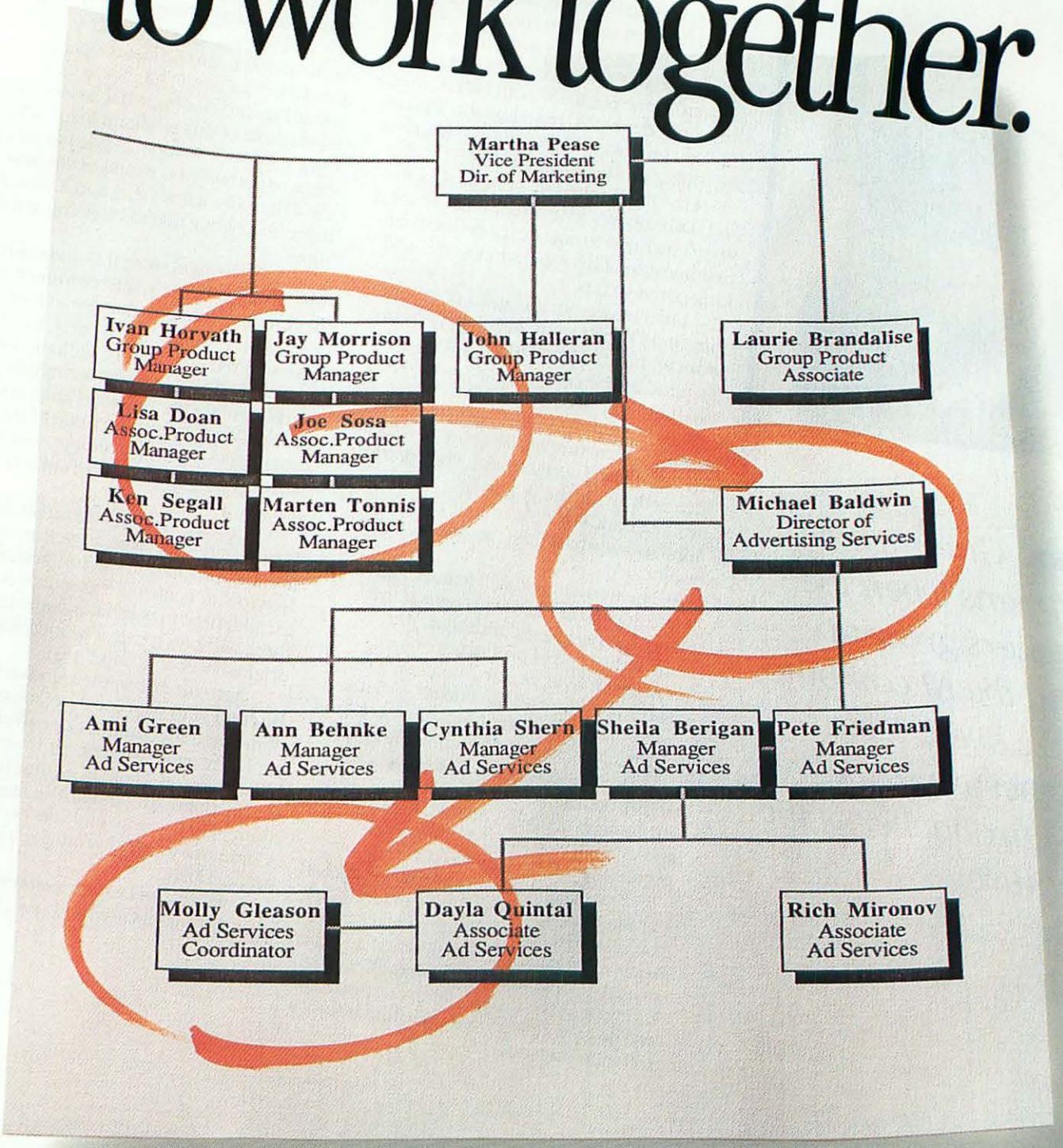
Leary also brought in artists Keith Haring and Peter Max, as well as noted fashion and portrait photographer Helmut Newton, to contribute graphics. And for the first time in computer game history, there will be a musical soundtrack by the original hacker group, Devo.

Neuromancer, the mind movie, will be coming to your local personal computer some time this summer or early fall. Initially, the game will appear in versions for the enhanced Apple IIGS, the IBM PC and compatibles, the Amiga, the Atari ST; then there will be a low-end version for the Commodore, and eventually, a Macintosh mind movie.

Since Tim Leary was so enthusiastic about William Gibson's book, I naturally

(continues)

How to get people who work together to work together.



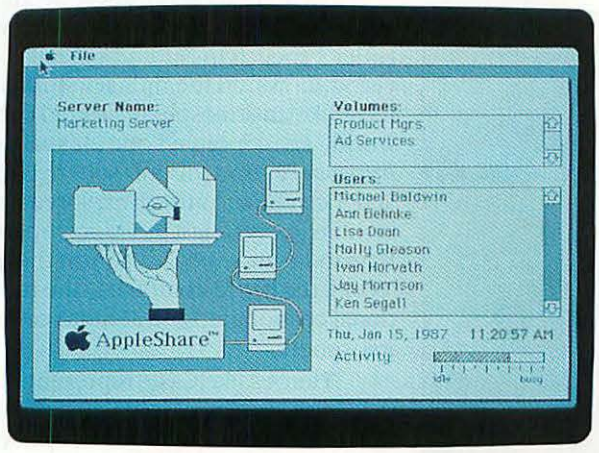
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The system utilizes a Macintosh with virtually any hard disk as a file server, so sharing is easy. Simply put a document into a folder, and it's available on the network. Instantly.

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Every time you create a document, AppleShare lets you decide how (or if) it's to be shared.

Thanks to AppleShare access control, you can grant rights to specific individuals, at three different levels: 1) see folder, 2) read documents within a folder and 3) make changes.

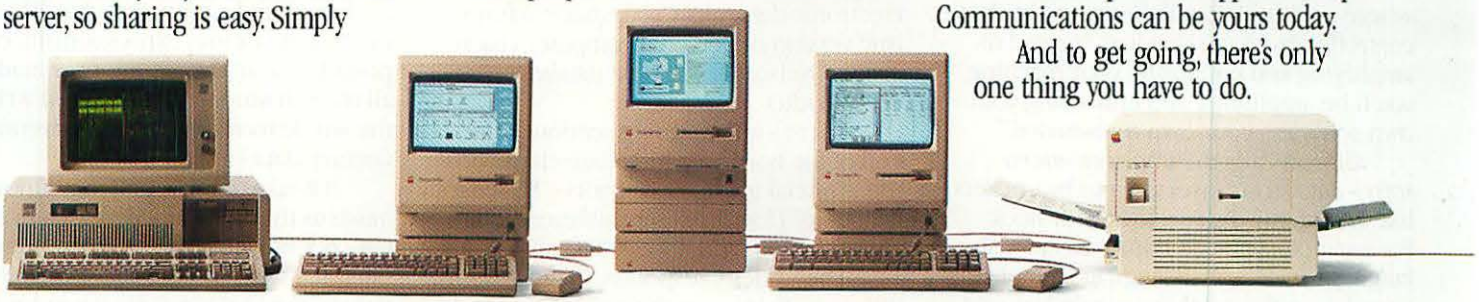
And each folder will contain the most recent versions of the work within. Because the system is constantly updating itself.

ALL TOGETHER NOW.

Apple Desktop Communications can do wonders for productivity, beyond merely sharing folders.

Using a program like InBox, one person can easily send electronic mail to anyone on the network. Or just as easily, to a pre-defined list of people. And these messages can include complete documents, such as those created by Microsoft Word or Excel.

With this new power, Apple Desktop Publishing becomes a whole new ballgame. Because quickly and electronically, you can collect the information you want to publish. Even from people who don't use Macintosh.



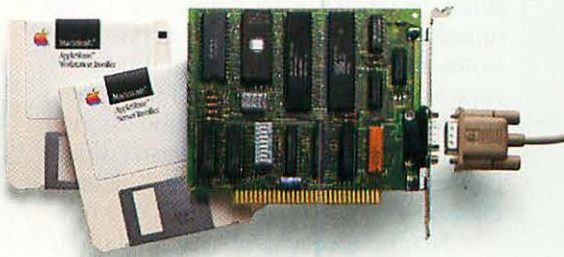
With Apple Desktop Communications, you can share information amongst a group of computers, including even those of the MS-DOS variety.

INTRODUCING THE APPLETALK PC CARD.

Now you can communicate with other forms of intelligent life.

Just plug our PC Card into an MS-DOS-based computer, and it too can become an active part of the AppleTalk network.

Then, using a program like InBox PC, ideas that are conceived



Now even your MS-DOS computer can become a card-carrying member of the AppleTalk network.

in the MS-DOS world can be painlessly transferred to a Macintosh.

Where they can be analyzed more deeply. Studied more insightfully.

And, with the able assistance of an Apple LaserWriter® printer, presented far more brilliantly.

TURN KNOWLEDGE INTO POWER.

Once you've begun sharing information within the workgroup, you'll likely thirst for greater power.

Which, as it just so happens, is readily available.

You can bring others into the group, via AppleTalk cabling, phone lines or fiber optic cabling. Link a number of workgroups together with options like Hayes InterBridge.

Or, with FastPath and EtherSC, even tie the whole company together on Ethernet cabling.

The full power of Apple Desktop Communications can be yours today.

And to get going, there's only one thing you have to do.

Start communicating:

Call 800-538-9696, Ext. 700, for the name of a participating Apple dealer near you.

The power to be your best.™

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became curious about it. I had also heard about *Neuromancer* from a few friends in the personal computer industry who assured me it was a marvelous book. Unfortunately, it wasn't easy to find in bookstores. Either the cultists are grabbing copies off shelves, or it hasn't hit the mainstream market yet. I finally found a copy and snatched it up eagerly. I wasn't disappointed. In fact, I didn't get much sleep that night, as I couldn't put the book down.

First published as an Ace Science Fiction paperback in 1983, *Neuromancer* quickly won the three top prizes in the sci-fi field–the Hugo, Nebula, and Philip K. Dick awards. It also ushered in a new genre of science fiction writing that's come to be known as *Cyberpunk.*

To my mind, Cyberpunk echoes a kind of gritty techno-aesthetic. In a sense, it's a hard-edged vision of the future of microcomputing. It's a world in which the ultimate interface between human and machine has finally been achieved, through biotech implants and sensory links with universal databases.

At the last Macworld Expo in San Francisco, personal computer pioneer and Apple Fellow Alan Kay said he thought the portable computer will have "finally arrived when you can wear it on your T-shirt."

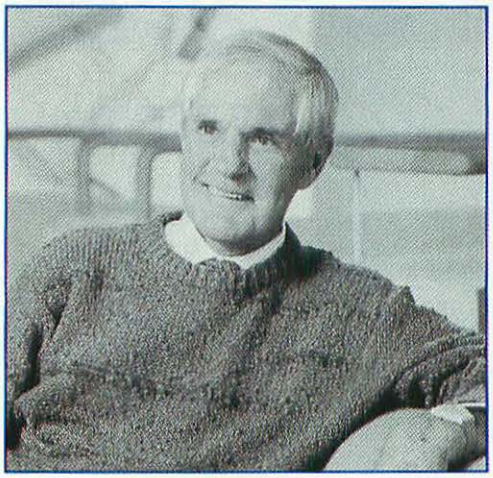
In *Neuromancer,* it's embedded in your skin. As Tim Leary commented to me, "In the future the individual will have access to all this high technology for his or her pleasure. You'll be able to have facelifts, muscle grafts, rejuvenation implants–your brain will bristle with implants.

"It's the ultimate techno-pagan society, where each individual's brain and body are controlled by that individual. Instead of amplifying and enhancing your machine, you'll be amplifying and enhancing your own software, your own *tissueware.*"

Gibson calls the implants *microsofts*–data strips inserted into biosockets, like an organic disk drive in your neck. For example, you could insert a Spanish-language microsoft, a language template complete with a working vocabulary and grammatical structure, that would slip transparently over your verbal mind.

Gibson admitted that he'd had no hands-on experience with personal computers when he wrote *Neuromancer.* "I don't think I could have written it if I had," he confessed. He wrote the book on a 1927 Hermes manual typewriter, although he now does word processing on an Apple IIc.

It stunned me to learn that Gibson could create *Neuromancer,* which I regard as almost a blueprint of future information technology, in a state of virtual computer illiteracy. I guess visionaries don't need to know code. The only baud rate they need is their own imagination.



A new-age Timothy Leary explains his "mind movies" to David Bunnell: Allowing you to produce and direct your own film, the star of the new software game is style, not technology or plot.

As with all good yarns, there is a basic conflict in *Neuromancer* that must be resolved. The hero, whose name is Case, is a code-cracking, techno-punk street kid who must break into a big-business AI matrix. In the process, he helps bring about a new intelligence entity–the sum of all known electronic data (aka *Cyberspace,* a futuristic version of personal computer visionary Ted Nelson's hypertext database, Project Xanadu).

There's an intriguing section at the end of the book in which Case chats with the artificial intelligence entity: "So what's the score? How are things different? You running the world now? You God?"

The AI deity responds, "Things aren't different. Things are things." "But what do you do? You just there?" Case persists. And the AI replies, "I talk to my own kind."

Of course, by now there are other AI matrixes in the universe that communicate with each other. "From where?" asks Case. "Centauri system." "Yeah? No shit?" says Case, impressed.

And God answers (this must be a first for God in written literature): "No shit."

Leary's years of playing the high priest of mind expansion back in the sixties stand him in good stead as he strives to define this new electronic entity that has sprung from our rapidly escalating information revolution: "It's the living matrix of all the electronic facts we've been putting up there [in the earth's atmosphere] since Marconi invented the radio in 1897," he told me.

"We've been sending electronic signals–the 'Amos 'n Andy' radio shows, Hitler's speech in Nuremberg, all the television shows, all the military stuff. It's almost like an atmosphere around the world," Leary pointed out. "It's called the *infosphere*–and this infosphere is there, and it can be colonized, explored, and used by humans. And just as France, Spain, and England competed to colonize the New World, the big AI combines–the multinational corporations–will try to control the infosphere.

"Heroes like Case, representing the true human spirit of individuality, will be dealing with this higher level of intelligence once it's formed."

The *Neuromancer* concept, of course, is based on quantum physics. Everything is information–all the universe is data. Sunlight, starlight, the galaxies. You can even describe the sun as a temporary collection of information.

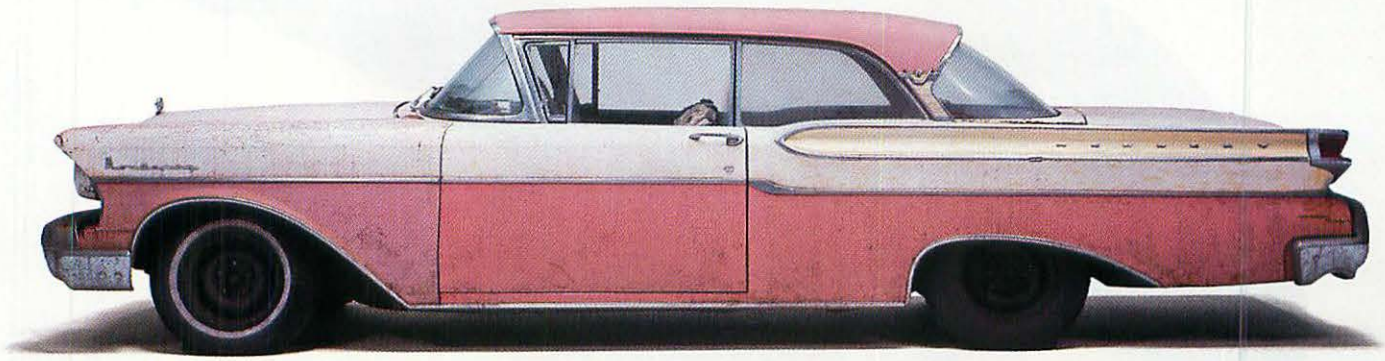
It is the role of the artist–and for that matter, of the personal computer visionary–to help the human species adapt to the notion that reality exists not just in heavy stone materials, in physical reality, but in clusters of off-on probability signals defined as the quantum mechanism.

In my opinion, and it's one I happen to share with Leary, that's what all jazz, modern literature, expressionism, cubism, pointillism, all the movies ever made, and all the software that's ever been written–the whole incredible heap of twentieth-century data–is all about.

If it takes a book or a mind movie to make us think about where we are heading–not only in terms of technology and personal computing, but collectively, as a human race evolving into a new and unknown electronic form–then all the more power to Gibson and Leary and all the other mind artists of Cyberspace.

Lights! Camera! Action! □

YOU WOULDN'T DRIVE A CLUNKER TO THE OFFICE.



SO WHY DRIVE O

What BMW has done for the automotive industry, Mirror Technologies has done for the hard drive industry. We don't simply crank out drives to meet current demands. We carefully engineer them to exceed yours.

Our products are extremely quick—taking you from 0 to 60 pages in a heartbeat. They handle like a dream as they wind through deskloads of information. And their reliability is unmatched. Built to go full throttle day after day. So you can overtake the pack. Instead of just running with them. So don't settle for a hard drive riddled with compromise. But rather, choose a drive built by a company that looks on compromise as a 4-letter word.

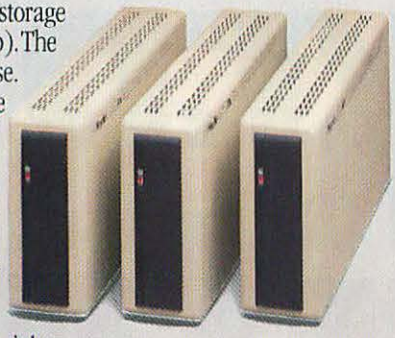
WE'VE GOT A GREAT TRACK RECORD.

Before you buy a drive from a company, you should take a look at their history. Ours is quite impressive.

We were the first to introduce an 800k drive for the Macintosh. First with the 20 meg tape backup. And first with the 85 meg, 172 meg and 340 meg hard drives.

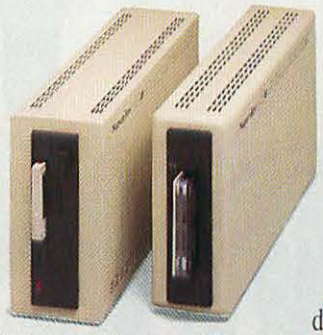
Our products are selling to companies like Honeywell, AT&T, 3M and Apple. Yet we've also pleased some companies that you probably haven't heard of. Like Don's Dog Service, Anderson's Nursery and Himalayan Expeditions. Who knows, maybe now that they have the right tools, these companies, too, will become household words.

MAGNET 20X, 30X AND INTRODUCING THE 40X.



Here are all the choices for storage you need (20, 30 and 40Mb). The 20X, perfect for everyday use. The 30X, 50% more storage for the price of our competitior's 20 meg drives. And introducing the 40X, offers all the storage you need for power computing. All cooled by our extra-quiet fan. They sit beside your Mac, so the system won't heat up. Daisy chain up to 7 units. They come with backup utilities and optional MacServe networking software (a $250.00 value). Preformatted, so just plug them in and run.

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For the serious user who can't afford to lose data. These "safety nets" keep a portable, permanent record of your data. So reliable, the Library of Congress uses us to backup their most critical data. Free software update policy so your tape drive can be updated as we update ours. We're the only one to deliver file by file, volume and incremental backup. With incremental, you backup *only* the data you've changed since your last backup. These totally secure systems run silent and cool. When we designed the new Tape 40, we worked side by side with Apple and 3M so it would be compatible with any products released by Apple in the future.

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The first 800k drive introduced for the Mac. Thousands of satisfied customers worldwide. Offers great speed and value. It's quiet and comes with a one-year warranty. Push button eject mechanism. Compatible with the Mac 128, 512 and Plus. Reads and writes 400K, 800K diskettes.



E IN THE OFFICE?

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A very fast 40 Meg hard with a dependable 40 Meg tape backup as a "safety net." Sits under your Mac so it doesn't take up extra space. The premier drive/tape backup combination in the market. Backup file by file, volume or incrementally. With incremental, you can usually backup your daily data in under 4 minutes. Comes standard with MacServe ($250.00 value) to allow you Multiuser, Multitasking. This drive is based on the NEC drive and the 3M Tape 40 — two leaders in their respective industries.

WHEN YOU WORK IN THE FAST LANE, YOU CAN'T AFFORD TO BREAK DOWN.

To win in today's fast and furious corporate arena, you need a drive that can survive the grueling pace. You need a well built machine.

Well you'll be happy to know that our drives are so well built that we were the first to introduce a full-year warranty. And of course this warranty is still policy today. Plus each unit comes with a Quality Assurance Report detailing every step of production. And finally, before a drive is allowed out the front door, it is tested for 24 continuous hours to insure its durability.

Our "pit crew" is equally dependable. If you ever have a problem, we have trained experts standing by. Just give us a call, toll free. And we'll have you up and running in no time. Flat.

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Three times faster than standard hard drives because we use voice coil technology. These combine blistering speed, enormous capacity with tape backup and Multiuser, Multitasking software (includes MacServe, a $250.00 value). All 3 are combination drives with integrated tape backup. Powerful, compact, quiet alternatives to the AST 4000. The 172 offers twice the capacity for the same price. (Based on the November 1986 suggested retail pricing.)

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WE'RE REVVING UP FOR THE FUTURE.

The Macs of tomorrow are just around the corner. And with Mirror Technologies, you can hit the ground running when they arrive.

Currently, we're shipping more drives than any other company except Apple. Like the 85X, 172X, the MagNet 40/40 and tape drives, too.

When File Servers hit the streets in January, we were there with big enough hard drives to tie dozens of Macs together. Other drives would blow an engine trying to do that.

And it's no secret that Apple is about to introduce bigger and better machines. We're ready for them, too. Because we're not waiting for the future to come to us. We're going out half way to meet it. That way, we come back with products that'll let you blow the doors off all those who remained standing still.

MIRROR TECHNOLOGIES Inc.

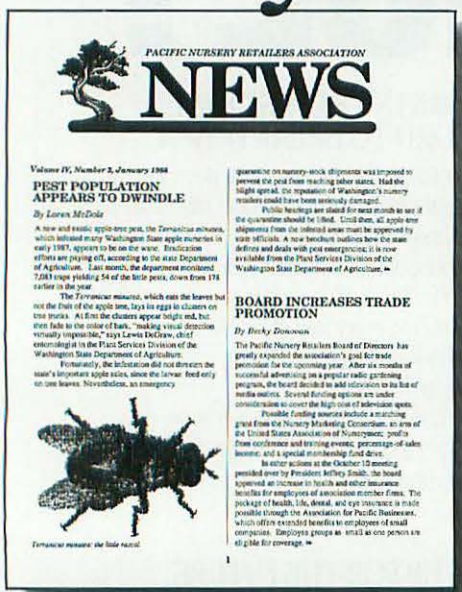
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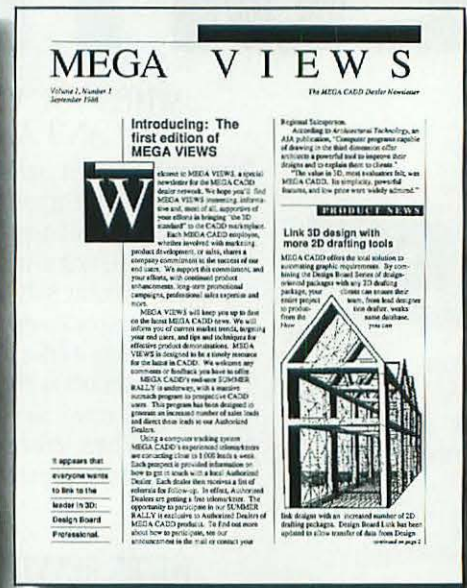
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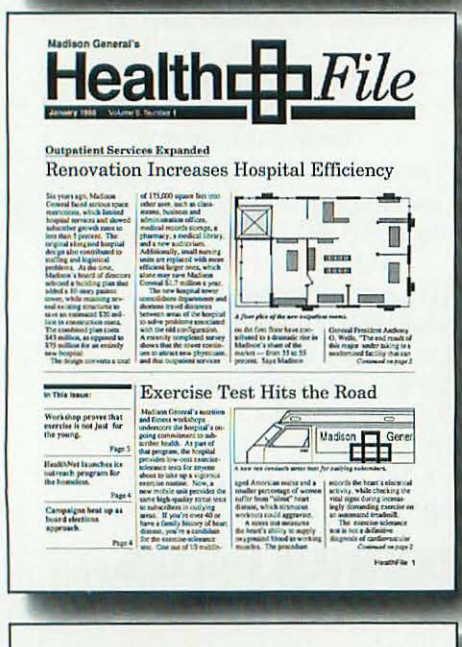
Circle 406 on reader service card

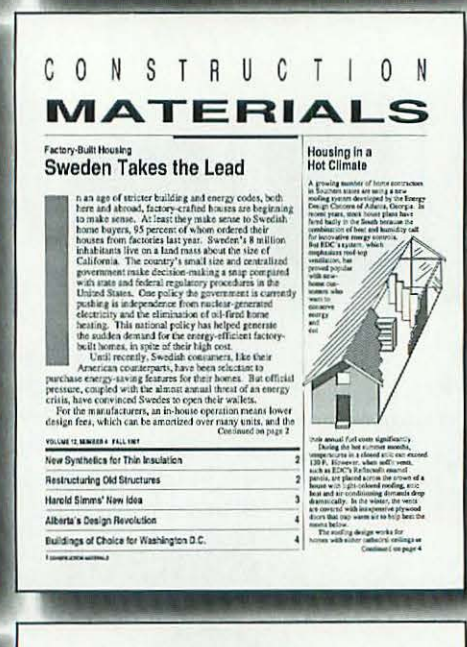
7 Ways To Make The News.


PACIFIC NURSERY RETAILERS ASSOCIATION
NEWS
Volume IV, Number 3, January 1988
PEST POPULATION APPEARS TO DWINDLE
By Loren McDole
A new and exotic apple-tree pest, the Terrantius minutus, which infested many Washington State apple nurseries in early 1987, appears to be on the wane. Eradication efforts are paying off, according to the state Department of Agriculture. Last month, the department monitored 7,083 traps yielding 54 of the little pests, down from 176 earlier in the year.
The Terrantius minutus, which eats the leaves but not the fruit of the apple tree, lays its eggs in clusters on tree trunks. At first the clusters appear bright red, but then fade to the color of bark, "making visual detection virtually impossible," says Lewis DeDraw, chief entomologist in the Plant Services Division of the Washington State Department of Agriculture.
Fortunately, the infestation did not threaten the state's important apple sales, since the larvae feed only on tree leaves. Nevertheless, an emergency quarantine on nursery-stock shipments was imposed to prevent the pest from reaching other states. Had the blight spread, the reputation of Washington's nursery retailers could have been seriously damaged.
Public hearings are slated for next month to see if the quarantine should be lifted. Until then, all apple-tree shipments from the infested areas must be approved by state officials. A new brochure outlines how the state defines and deals with pest emergencies; it is now available from the Plant Services Division of the Washington State Department of Agriculture.
Terrantius minutus: the little rascal.
1
BOARD INCREASES TRADE PROMOTION
By Becky Donovan
The Pacific Nursery Retailers Board of Directors has greatly expanded the association's grant trade promotion for the upcoming year. After six months of successful advertising on a popular radio gardening program, the board decided to add television to the list of media outlets. Several funding options are under consideration to cover the high cost of television spots.
Possible funding sources include a matching grant from the Nursery Marketing Consortium, an arm of the United States Association of Nurserymen; profits from conference and training events; percentage-of-sales income; and a special membership fund drive.
In other actions at the October 10 meeting presided over by President Jeffrey Smith, the board approved an increase in health and other insurance benefits for employees of association member firms. The package of health, life, dental, and eye insurance is made possible through the Association for Pacific Businesses, which offers extended benefits to employees of small companies. Employee groups as small as one person are eligible for coverage.


MEGA VIEWS
Volume 1, Number 1
September 1988
The MEGA CADD Dealer Newsletter
Introducing: The first edition of MEGA VIEWS
Welcome to MEGA VIEWS, a special newsletter for the MEGA CADD dealer network. We hope you'll find MEGA VIEWS interesting, informative and, most of all, supportive of your efforts in bringing "the 3D standard" to the CADD marketplace.
Each MEGA CADD employee, whether involved with marketing, product development, or sales, shares a company commitment to the success of our end users. We support this commitment, and your efforts, with continued product enhancements, long-term promotional campaigns, professional sales expertise and more.
MEGA VIEWS will keep you up to date on the latest MEGA CADD news. We will inform you of current market trends, targeting your end users, and tips and techniques for effective product demonstrations. MEGA VIEWS is designed to be a timely resource for the latest in CADD. We welcome any comments or feedback you have to offer.
MEGA CADD's end-user ZOMBIE RALLY is underway, with a massive outreach program to prospective CADD users. This program has been designed to generate an increased number of sales leads and direct those leads to our Authorized Dealers.
Using a computer tracking system MEGA CADD's registered clients/users are contacting close to 1,000 leads a week. Each prospect is provided information on how to get in touch with a local Authorized Dealer. Each dealer then receives a list of referrals for follow-up. In effect, Authorized Dealers are getting a free telemarketer. The opportunity to participate in our SUMMER RALLY is exclusive to Authorized Dealers of MEGA CADD products. To find out more about how to participate, see our announcement in the mail or contact your Regional Salesperson.
According to Architectural Technology, an AIA publication, "Computer programs capable of drawing in the third dimension offer architects a powerful tool to improve their designs and to explain them to clients."
"The value in 3D, most evaluators felt, was MEGA CADD. Its simplicity, powerful features, and low price were widely admired."
PRODUCT NEWS
Link 3D design with more 2D drafting tools
MEGA CADD offers the total solution to automating graphic requirements. By combining the Design Board Series of design-oriented packages with any 2D drafting package, your [illegible] can ensure their easier project to produc- from the [illegible]
[illegible] clients can ensure their team, from lead designer to [illegible] to the dealer, works same database, you can
It appears that everyone wants to link to the leader in 3D: Design Board Professional.
Link design with an increased number of 2D drafting packages. Design Board Link has been updated to allow transfer of data from Design
continued on page 2


INVESTMENT
OPTIONS
MONEY MATTERS
OTC Investment Strategies Worth Considering
By Jonathan Hall
It's not the best of times for individuals investing in over-the-counter stocks. In May, the market dropped almost 9 percent. In the last few weeks, prices for blue chip stocks have bounced back somewhat, but smaller companies trading on the OTC market have seen little activity.
"Particularly in the over-the-counter market, buy low."
Prior to the May slump, it looked as if individual investors could buy almost anything, then sit back and count their earnings. But it's a different matter of late: prices, profits are slow to materialize, so a wrong move can cost big money.
Yet, according to Bill Sides, whose Santa Financial Report comments on the performance of OTC portfolios, these companies scored respectable gains of 8 to 17 percent during this down period. The three firms — LA Research (Los Angeles), Market Masters (Dallas), and Loeb Performance Report (New York) — had similar investment strategies. Each looked for mfr stocks at low prices in relation to earnings.
"Why buy blue chips at 30 times earnings because of their potential?" says Bill Barnett of Market Masters, who likes companies involved in food processing because their stocks are low-priced. Jay Loeb agrees: "Particularly in the over-the-counter market, buy low." Nothing, however, beats a bullseye, which is what Market Masters accomplished by recommending
continued on page 2
Kaplan to Sell Its Cable Unit for $612 Million
By Christine Davis
Kaplan Johnson Investments Co., which bought out Worldwide Broadcasting, Inc., in 1984, from the Stroud family, will sell Worldwide's cable unit to Leslie M. Stroun Group for $612 million. The figure ranks among the highest price ever paid for cable assets and represents a cost of almost $1300 to each investor.
According to Kaplan Johnson, the Stroun Group will make the purchase through a joint venture with Bates Broadcasting and certain members of Worldwide's management staff. The cable unit is part of a continuing effort on the part of Kaplan Johnson to relinquish media holdings at a significantly higher prices than it paid for them.
Leslie M. Stroun is a member of the Stroun family of El Paso, Texas. Besides his stake in Bates Broadcasting, he has large commercial real estate holdings near the border.
Worldwide Cable serves 410,000 subscribers in Jackson, Texas, Mississippi, Alabama, and Arkansas. Says John Walker Sr., who runs a cable
continued on page 14
FUTURES
[illegible] A crazy quilt and a fond scrapbook 1993
CONTENTS
AMEX STOCKS 4
COMMODITIES 8
EDITORIALS 12
FOREIGN EXCHANGE 3
GOVERNMENT ISSUES 14
MONEY RATES 15
OPTIONS 3
NYSE 13
ODD LOT 14
OTC STOCKS 13
TRADING 7
TREASURY ISSUES 11
INVESTMENT OPTIONS 1


Madison General's
HealthFile
January 1988 Volume 5, Number 1
Outpatient Services Expanded
Renovation Increases Hospital Efficiency
Six years ago, Madison General faced serious space restrictions, which limited hospital services and slowed subscriber growth rates to less than 5 percent. The original 40-bed hospital design also contributed to staffing and logistical problems. At the time, Madison's board of directors selected a building plan that added a 10-story patient tower, while retaining several existing structures to save an estimated $20 million in construction costs. The combined plan costs $45 million, as opposed to $75 million for an entirely new hospital.
The design converts a total of 175,000 square feet into other uses, such as classrooms, business and administration offices, medical records storage, a pharmacy, a medical library, and a new auditorium. Additionally, small nursing units are replaced with more efficient larger ones, which alone may save Madison General $1.7 million a year.
The new hospital tower consolidates departments and shortens travel distances between areas of the hospital to solve problems associated with the old configuration. A recently completed survey shows that the tower configuration is attract new physicians, and that outpatient services on the first floor have contributed to a dramatic rise in Madison's share of the market — from 33 to 55 percent. Says Madison General President Anthony G. Wells, "The end result of this major undertaking is a modernized facility that can
Continued on page 2
A floor plan of the new outpatient rooms.
In This Issue:
Workshop proves that exercise is not just for the young. Page 3
HealthNet launches its outreach program for the homeless. Page 4
Campaign heat up as board elections approach. Page 4
Exercise Test Hits the Road
Madison General's nutrition and fitness workshops underscore the hospital's ongoing commitment to subscriber health. As part of that program, the hospital provides low-cost exercise-tolerance tests for anyone about to take up a vigorous exercise routine. Now, a new mobile unit provides the same high-quality tests to subscribers in outlying areas. If you're over 40 or have a family history of heart disease, you're a candidate for the exercise-tolerance test. One out of 15 middle-aged American males and a smaller percentage of women suffer from "silent" heart disease, which increases workers could aggravate.
A stress test measures the heart's ability to supply oxygenated blood to working muscles. The procedure records the heart's electrical activity, while checking the vital signs during increasingly demanding exercise on an automated treadmill. The exercise-tolerance test is not a definitive diagnosis of cardiovascular
Continued on page 2
A new test contends some fears for enabling subscribers.
HealthFile 1


CONSTRUCTION
MATERIALS
Factory-Built Housing
Sweden Takes the Lead
In an age of stricter building and energy codes, both here and abroad, factory-crafted houses are beginning to make sense. At least they make sense to Swedish home buyers, 95 percent of whom ordered their houses from factories last year. Sweden's 8 million inhabitants live on a land mass about the size of California. The country's small size and centralized government make decision-making a snap compared with state and local regulatory procedures in the United States. One policy the government is currently pushing is independence from nuclear-generated electricity and the elimination of oil-fired home heating. This national policy has helped generate the sudden demand for the energy-efficient factory-built homes, in spite of their high cost.
Until recently, Swedish consumers, like their American counterparts, have been reluctant to purchase energy-saving features for their homes. But official pressure, coupled with the almost annual threat of an energy crisis, have convinced Swedes to open their wallets.
For the manufacturers, an in-house operation means lower design fees, which can be amortized over many units, and the
Continued on page 2
Housing in a Hot Climate
A growing number of home contractors in Southern states are using a new roofing system developed by the Energy Design Caucus of Atlanta, Georgia. In recent years, steel roofs have been hard hit in the South because the combination of heat and humidity call for excessive energy expenses. But EDC's system, which emphasizes roof top ventilation, has proved popular with southern home customers who want to conserve energy and cut
their annual fuel costs significantly.
During the hot summer months, temperatures in a closed attic can exceed 120 F. However, when soffit vents, such as EDC's Reflectix enamel panels, are placed across the crown of a house with light-colored roofing, attic heat and air-conditioning demands drop dramatically. In the winter, the vents are covered with inexpensive plywood doors that can warm air to help heat the rooms below.
The roofing design works for homes with either cathedral ceilings or
Continued on page 4
VOLUME 12, NUMBER 4 FALL 1987
New Synthetics for Thin Insulation 2
Restructuring Old Structures 2
Harold Simms' New Idea 3
Alberta's Design Revolution 4
Buildings of Choice for Washington D.C. 4


The South Sarasota Yacht Club
WINDJAMMER
Issue Number 55, January 1988
Winning Form in Dominican Regatta
U.S. Team Surprises the World
The Americans seemed as shocked as anyone that they brought the Dominican Cup home for Christmas last month. They did so mainly through the sleek performance of their fast One-Tonner, Taba, owned by Stephen Armstrong. Doug MacIntyre, 1983 Olympic silver medalist in sailing competition, skippered the winning boat, with South Sarasota yachtsman Dwight Burgess steering Taba in the decisive second race.
The rest of the team, competing in two larger yachts, lagged painfully behind, but their final results were good enough to keep the Yanks ahead in the end. Larry Young's Sunrize (rated 32.0) was 16th; Mark Miller's Four Score (35.2) was 18th.
Changing weather patterns made consistent sailing almost impossible. Although a good wind blessed challengers in the first race, which was run on an Olympic inshore course, a faint-hearted breeze marred the shorter offshore race for most of the teams. The brief gusts in the second race, however, worked to Taba's advantage, according
continued on page 2
The valiant Taba: upsetting expectations.
Foresight Forestalls Emergencies
Agile action such as crouching, crawling, and sliding backside-first is one way to keep body and soul above sea level. But it's not always enough, especially for a busy crew, which can sometimes overlook personal safety to get a job done quickly. And a stockpile of high-tech rescue gear may only lull an otherwise smart sailor into a false sense of security. The best hedge against a man-overboard emergency is careful planning.
One of the easiest and cheapest safety measures is extra 6-foot tail stops, which you can fashion quickly into temporary grab lines. Sail-stop material, available from any sailmaker, is tough and virtually slip-proof. It knots well, and you can cinch it to the metal tubing of the pulpit with a rolling hitch.
In foul weather, additional makeshift grab-lines can spell the most experienced seafarer's fears. Climbing from the cabin to the cockpit, for instance, is a treacherous proposition, considering the likelihood of your being thrashed overboard after standing upright. However, by securing sail-stop loops within easy reach on both sides of the cockpit, you can mitigate this danger.
If deck-top lifelines are incompatible with your boating style, or you require additional safety measures, the only alternative is a safety harness. But it's important to remember that, like rescue
continued on page 3


legal line
Volume 2 Number 6 January 1988
Family Law to Highlight D.C. Meeting
Carrie Johnson
Almost every attorney comes in contact with some facet of family law during the course of a career. But how it's more important than ever to keep abreast of family law statutes. This year, the state legislature passed the controversial Juvenile Justice and Family Law Reform Act, which is the focus of the state bar association's annual meeting in Washington, D.C., March 3-5.
The new legislation radically changes the philosophical underpinnings of the juvenile justice law that was guided the state since 1911. The intent of the original family law was to allow courts to act in place of parents whenever abuse or neglect endangered a child's well-being or contributed to delinquent behavior. As the family courts evolved during the century, the emphasis on treating and rehabilitating children grew in importance.
The new law, however, draws a sharp distinction between abused and delinquent children. While children in need of protection from indifferent or cruel caretakers are handled as before, delinquent youth are now held accountable for their actions in much the same way adult offenders are. Court proceedings are more adversarial in nature, the accused receive the full panoply of rights, and rules of evidence apply. Court proceedings for youthful offenders are open to the public and press — in line with legislative thinking that it is the public's right to know how the courts dispose of cases involving the criminally accused.
Still, legislators were not indifferent to the concerns of child
continued on page 2
An Evening with Justice Long
Frank Blackstock
On December 28, in Hiker House overlooking the Wabash, attorneys, dignitaries, and the like gathered for cocktails, dinner, and testimonials honoring Gus Supreme Court Justice Howard Long. Lincoln County Bar Association President Clarence Harvey delighted the evening to pay tribute to Justice Long's 22 years on the high-court bench, and not as one
[illegible] former colleagues, to mark the judge's
continued on page 8
Justice Long
Ownership Dominates Office Moves
Christine McCarthier
The buzzword for law-office relocation in 1988 is equity. Owning your digs means controlling your economic and spatial destiny, while avoiding the many pitfalls of moving when business takes off. The value of such an arrangement is clear — it is estimated that converted class for law-firm space can easily reach $75 a square foot.
Finding a building with the right location and space requirements, however, often proves to be an insurmountable obstacle. Affordable buildings with room for expansion usually exclude loft or warehouse real estate outside the hub of the city — less than ideal accommodations for a growing firm. But fortunately, certain building trends in the '90s have worked to the advantage of professional industries such as legal services.
The most important of these is the almost one-stop office construction that has created a secure-tool glut and left many developers shaking in their boots. The builder's dilemma is a tenant's delight — often taking the form of rent abatements, construction packages, and, yes, partial ownership.
An equity position for a law firm translates into tax write-offs, depreciation allowances, additional cash flow, and fixed rent for the life of the lease. Other fiscal
continued on page 7
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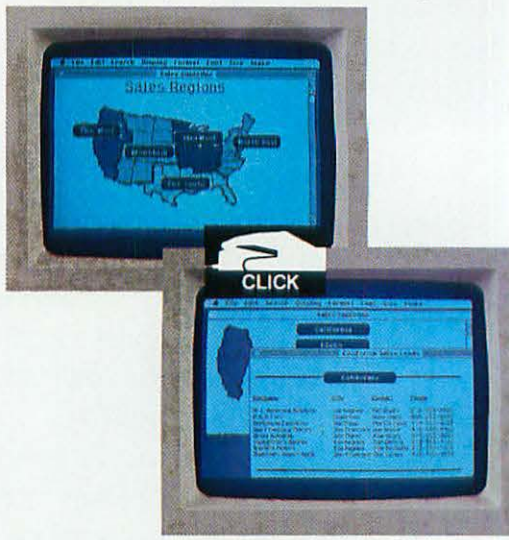
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Letters

A forum for Macworld readers



MICK WIGGINS

A Surge of Interest

Won't you devote some space to reviewing surge suppressors? I'm sure many computer users would agree on the necessity of having one. Unfortunately, most dealers seem to sell you whichever one they have in stock rather than advising you on which is best. Finding out that your newly purchased surge suppressor is nothing more than a one-to-six outlet converter is an experience that can cost you plenty in repairs.

Paul A. Wrench
Houston, Texas

Great idea. We've already put somebody on the story.–Ed.

Further Miscues by Mail

Last year I became a member of PC Network in order to purchase equipment from them by mail. Delivery was delayed so long that I canceled my order but was told that the membership fee was nonrefundable. I accepted that; now I find that my Visa card has been charged another $8 without authorization–presumably to renew my membership. I have protested and wonder whether you've heard of other instances of such charges on their part.

Robert E. Moore
Ithaca, New York

We recently received a similar complaint from another customer who canceled his initial order but was still charged a membership fee. Steve Dukker of PC Network informs us that the membership charge is automatic unless you state that you do not want to join–a practice that apparently is legal. Dukker assures us that they will remove the charge at once if asked to.–Ed.

A Lovely Color

The ColorPrint (version 2.1) that I received with the *FullPaint* upgrade printed only four of five overlays. However, I/O Design, to which ColorPrint is licensed, acknowledged the problem and sent me a version 2.4 replacement. It works great now.

Bob Frost
Fort Worth, Texas

Market Forces at Work

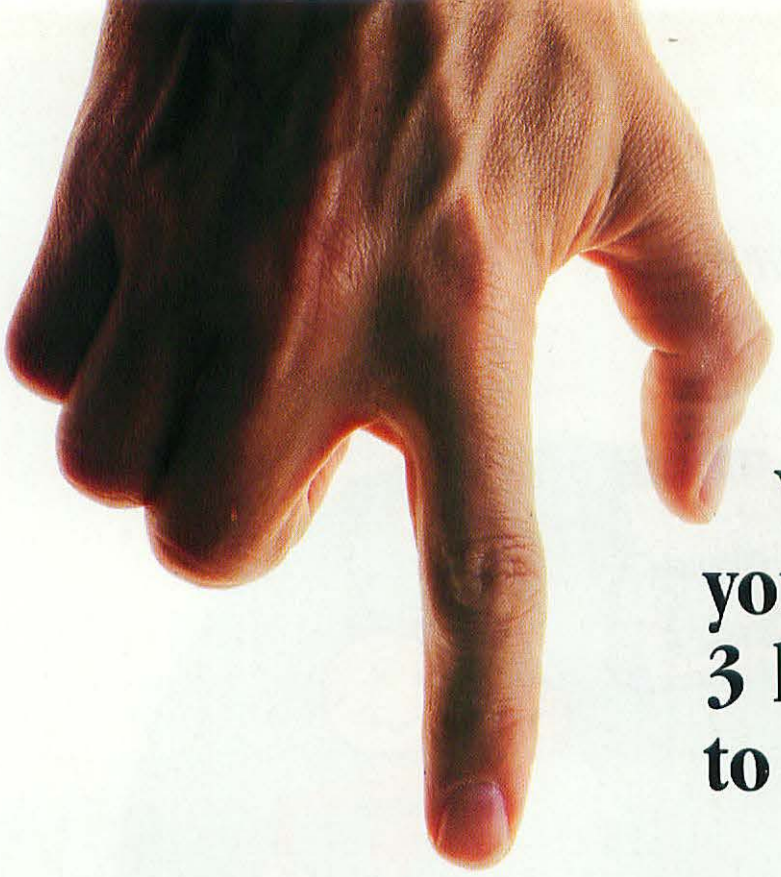
The various Macintosh magazines have been full of editorials, letters, and even articles decrying the increasing cost of software, the falling prices of Mac upgrades and accessories (from those who bought too soon), software upgrade problems, bugs, the incompatibility of the 128K Mac (with internal 440K drive) with a Mac Plus, and other such woes. One gets the impression that Mac owners are doomed to run on an endlessly turning treadmill of increasing costs and complications, never to catch up.

However, there is also some good news–largely, we suspect, because marketplace forces have been at work. With software firms going out of business and new ones appearing, we've seen the variety, sophistication, and compatibility of programs mushroom. Ultimately, this adds up to a buying public that demands service and is chary of buying new products without a test. This necessitates that firms go the extra step to gain and retain customer loyalty.

The past year has been a good one for small-scale users of the Mac in this respect. Let's keep our eyes open and our standards high.

Bruce and Dolores Schoch
Williamsburg, Virginia

(continues)



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Letters

Right Roles or Wrong

Steven Levy made two mistakes about role-playing games in his recent article "The Game Hall of Fame" [*Macworld,* December 1986] that need to be corrected. The first is minor—there are no Vorpal Bunnies in the Mac version of *Wizardry*. Otherwise, I agree with Levy's conclusion that the Mac version is much easier to play than the Apple II version from the housekeeping standpoint.

But his choice for runner-up is outrageous; *Xyphus* is the worst role-playing game ever written. Movement around the board is very tedious; the Save and Restore functions (which are absolutely necessary) are too easy to interchange, which can wipe out your whole game. The programmers have built in a nasty time bomb, too—if you haven't included an Elf in your party, you can play through the game almost to the end and not be able to finish it.

The fact that Levy recommends this game convinces me that he gave it no more than a superficial evaluation. How about *Ultima II* or *III* instead?

Scot M. Loomis
Honolulu, Hawaii

Video Feedback

As a hardware developer for the Mac, I was particularly interested in "What's on TV?" [*Reviews,* December 1986], but I'd like to point out a few things about converting the Mac's image into TV video. The reviewer seems confused about information on the RS-170A video format, which is, in fact, standard for televisions, monitors, and projection systems with direct video inputs. The RS-170A standard spells out in detail amplitude, timing, and other specifications for the NTSC standard, which was created to deal with color encoding, so it doesn't apply to a monochrome signal; but "NTSC composite video" and "RS-170A" are usually used synonymously.

Macintosh composite video adapters, which provide a video output connector, don't even come close to meeting RS-170A specifications, so they won't work with VCRs and most video equipment. And while many computers can output to a standard monitor, I don't know of any that meet RS-170A specs either. They usually output a noninterlaced signal to eliminate flicker like the MacVideo Processor has. If you want to hook up to standard video equipment, you need an RS-170A output.

Phil W. Doberenz
West Linn, Oregon

Author Gordon McComb responds that the MacVideo Processor is designed specifically to connect with standard video products such as televisions, VCRs, and color monitors; this compatibility is its raison d'etre and the reason for its rather large price tag. According to McComb, the processor does not have to meet RS-170A specs exactly in order to work. The MacVideo Processor may not work in every instance, such as with an older TV, but generally it does. —Ed.

Reflex Action Requested

Our church purchased Borland's *Reflex* program to keep membership records, and now we find that dates prior to 1904 cannot be entered into the program. Must we tell our senior members that they may not have their "old" records put into our "new" computer? The Borland ads say that "*Reflex* lets you get your various acts together." I wish they'd get *their* act together and fix this needless bug.

Don Lund
Stillwater, Minnesota

A spokesperson at Borland says this is not a bug in the program but a result of the setting of the Mac's clock, which does not go back beyond 1904. Borland reports that a significant amount of extra development would be required to avoid this. Microsoft Excel *and* dBase Mac, *for example, also have this limit, as does, according to Contributing Editor Jim Heid, any package that uses the Mac's internal date routines. One exception is* FileMaker Plus.

Contributing Editor Lon Poole recommends the following methods to get around the date problem. If you want to sort according to birthdate, create separate fields for day, month, and year; then do a compound sort using all three fields. Or enter dates in reverse in a single field (year, month, day) and work with them that way. Be sure to fill in all necessary digits (entering, for example, 01 *instead of* 1 *for January or the first day of the month). —Ed.*

In Defense of the Scheme

I have several comments about "LISP in a Shoe Box" [*Reviews,* December 1986]. The reference to 2 megabytes being required

(continues)

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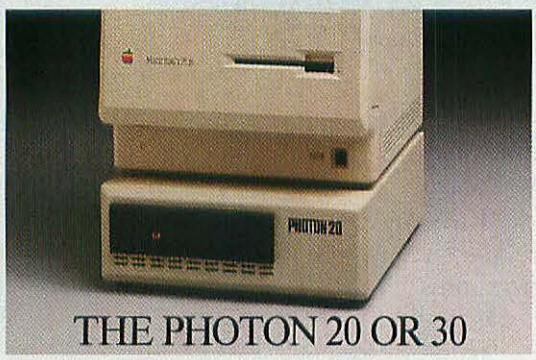
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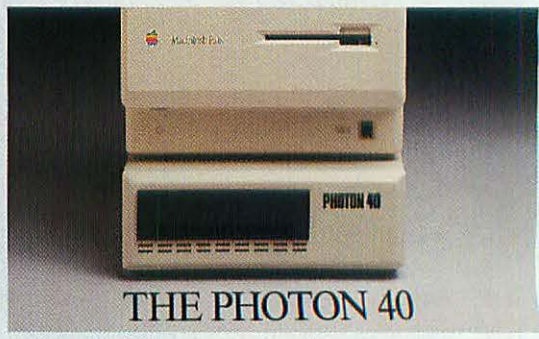
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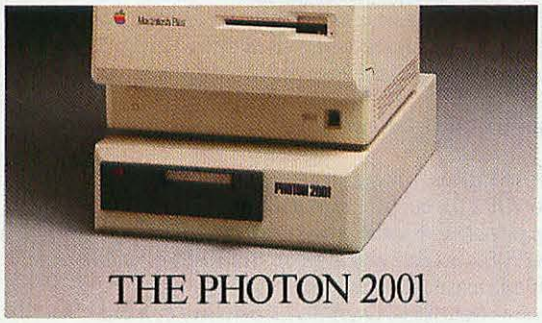
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OverVUE. Best Database of the Year.



Choosing a database manager is no easy task. It's by far the most confusing and fiercely competitive field in Mac software. But now your buying decision is crystal clear, because the editors of MacUser and the readers of MACazine have both selected OverVUE as the Best Database of the Year.

Said MacUser (Jan. 1986), in selecting OverVUE for its **Editors Choice Award:** "OverVUE 2.0 is a deceiving program in that the more you use it, the more you realize what it can do. Power, speed and logical menus make this a dream database."

When MACazine (Jan. 1986) bestowed OverVUE with its **Readers' Choice Award,** they wrote: "We selected OverVUE because of its ease of use, clairvoyance and statistical capabilities. The fact that OverVUE was subsequently selected by our readers as Best Database simply confirms our original assessment: the product is a jewel and the customer support a bonus!"

OverVUE's clean sweep of these two prestigious awards only confirms what everyone else has been saying all along:

Infoworld (July 8, 1985): "...it is Macintosh software done right."

Icon Review (Fall 1985): "OverVUE 2.0 is our favorite database workhorse...it simply offers the best balance of power and ease-of-use available on the market today."

Nibble Mac (Oct. 1985): "OverVUE is not only easy to set up, it's the easiest for data entry. Its tools for entering repetitive data minimizes typing time."

Online Today (electronic version — Nov. 1985): OverVUE 2.0 is a heavy-duty data management tool... It does all the things a good relational database manager should."

OverVUE's features and power make it the ultimate database choice. Clearly, users and editors alike think OverVUE is something special. We think you will, too.

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Circle 77 on reader service card

Letters

"for any serious work" implies that this is a "con" peculiar to *MacScheme*. Not so—LISP is often used for artificial intelligence (AI) applications, which sometimes present very big programs. All LISP interpreters face the same problem here. Nevertheless, LISP is useful for many other applications that aren't so memory-intensive. As to the robustness of *MacScheme* for commercial development, it provides access to the toolbox, and since Texas Instruments wrote AI applications for *PC-Scheme* (for the IBM PC), I'd bet the same can be done in the Mac version.

Your reviewer's statement that previous knowledge of LISP is required is somewhat misleading, since *Scheme* is the most intuitive and coherent dialect of LISP and the easiest system in which beginners can learn the language. In addition, several good tutorials have been published.

The benchmarks you listed had no explanations as to what they were or what aspects of the interpreter they purported to test, and so they contribute nothing of real value.

The stop-and-copy style, which is the simplest form of garbage collection, was made to sound like it detracts from the potential size of user programs, but since *Scheme* is not an obese program, there's plenty of space for programs.

In short, it seems to me not that *MacScheme* is LISP in a shoe box, but that other LISPs are needlessly large.

André van Meulebrouck
Denver, Colorado

A Surge of Interest

Won't you devote some space to reviewing surge suppressors? I'm sure many computer users would agree on the necessity of having one. Unfortunately, most dealers seem to sell you whichever one they have in stock rather than advising you on which is best. Finding out that your newly purchased surge suppressor is nothing more than a one-to-six outlet converter is an experience that can cost you plenty in repairs.

Paul A. Wrench
Houston, Texas

Great idea. We've already put somebody on the story.—Ed.

(continues)

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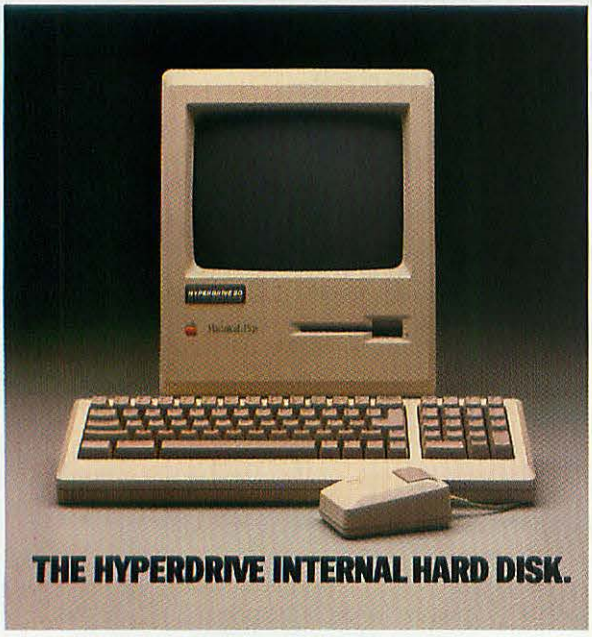


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THE HYPERDRIVE INTERNAL HARD DISK.

If you're among the inner-directed, we can mold a Macintosh in your own image.

Through HyperDrive 20—the first hard disk to be installed *inside* the Mac or Mac Plus and connected directly to its microprocessor.

The resulting Macintosh can, in its own quiet and unobtrusive manner, outperform any other Mac in its class.

It can not only store as much information as 50 diskettes. But it will also reduce power-up time by 66% over a Mac Plus. Load Aldus' PageMaker 150% faster. Microsoft's Excel 250% faster. And so on.

Which should more than satisfy anyone's need for speed. Unless, of course, you need something "lightning fast," which is how Macworld magazine described HyperDrive 2000.

This internal hard disk system also includes an additional microprocessor and a floating-point processor—turning the Macintosh into an authentic number-cruncher. In fact, a Mac with HyperDrive 2000 can perform computations from 10 to an astonishing 250 times faster than a Mac Plus.

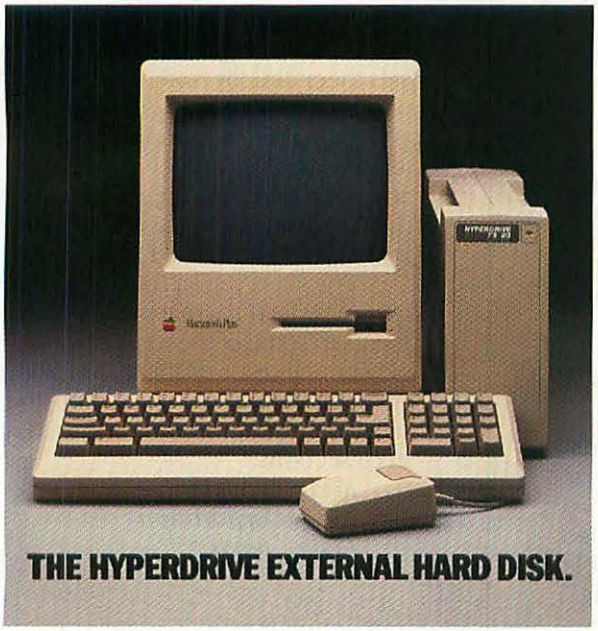
Both of these HyperDrives can be linked with regular Macintoshes through HyperNet 2.0. Our new networking software that's universally compatible with any Macintosh and any hard disk, internal or external.

But sheer speed aside, what distinguishes all HyperDrives is the ingenious software package they're equipped with. Software you can learn more about by consulting the ad on the right.

GENERAL COMPUTER

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HIGH PERFORMANCE FOR EXTROVERTS.



THE HYPERDRIVE EXTERNAL HARD DISK.

The FX/20 and FX/40 are the most outgoing members of the HyperDrive family.

They spend their time on desktops, in the company of other office tools, and connect directly to any Macintosh with an SCSI port.

The resulting Mac is extremely fast, which will come as no surprise to anyone familiar with HyperDrives. (If you aren't familiar, see the fourth paragraph of the ad to the left.)

Nor is it surprising that our FX series is extremely accommodating, providing a vast 20 or 40 megabytes of storage.

The real surprise, at least for those familiar with external hard disks, is all the software the FX comes with.

Such as a program that protects your documents by making back-up copies of them onto diskettes.

Another program protects your documents from certain excesses of sociability—denying access to anyone who doesn't know the password you choose.

Still another program automatically queues up documents for your ImageWriter or LaserWriter. So you can go on to other jobs without waiting for your printer.

In short, no other external hard disk does everything that HyperDrive FX/20 or FX/40 does. Which is a distinction it shares with the internal HyperDrives in the ad on the left.

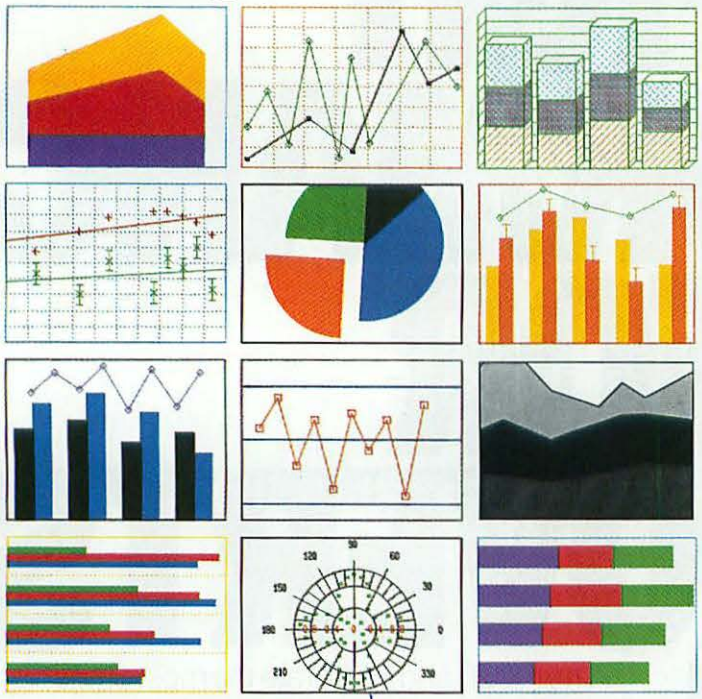
Over 1200 authorized General Computer dealers will be more than happy to help you establish a meaningful relationship with either. For the name of the dealer nearest you, just call (800) 634-9737.*

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Circle 384 on reader service card

Letters

Static

I welcomed the article on *Stat80* ["The Statistics Standard," November 1986] because your readers should be made aware of the powerful statistics packages available for the Macintosh. However, author Terry Ward was incorrect in saying that the new *StatView 512+* is *Stat80*'s only rival in the Macintosh market.

The Mac version of *Systat,* from Systat Inc., has virtually all the features of *Stat80,* and its reputation among statisticians has been established in the IBM PC market. Given the existence of these other products, Ward's article might be interpreted to be more an advertisement for *Stat80* than a serious survey of possible "standards" for statistical packages.

Reggie Schoonover
Charlottesville, Virginia

Font Response

While we appreciate the comments made about our *Fontographer* in your review of *LaserWorks* ["The Fountain of Fonts," *Reviews,* November 1986], Richard Jantz made one erroneous statement that may prove confusing to your readers. *Fontographer* does not generate PostScript fonts by way of QuickDraw; rather, it generates them directly from data entered by the user. In fact, *Fontographer*'s PostScript-generating function supports advanced features, such as gray characters, and has an option to reduce the amount of memory the font occupies in the printer, which allows more downloaded fonts.

The latest version of our product contains new features that include improvements to some of the weaknesses your reviewer noted; for example, its test-print capability is quicker. In addition, the manual now has expanded tutorial and reference sections.

Kevin Crowder
Altsys Corporation
Plano, Texas

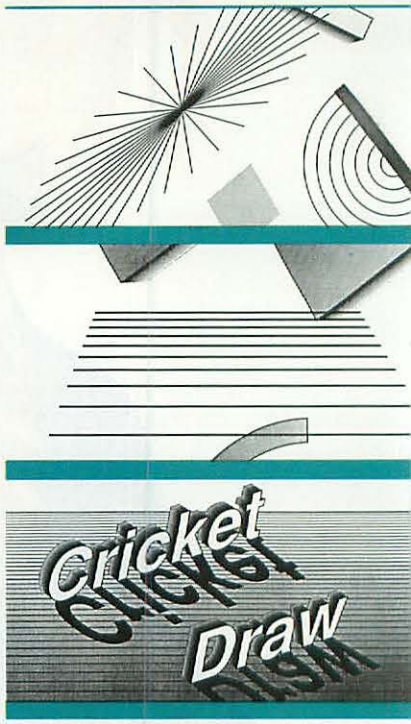
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INTRODUCING

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The kind of features you only dreamed possible, such as full rotation and tilting of any object, controlled shadowing, shading with a gray scale (0-100%), fountains (graded tints), starbursts, grates, bezier curves and much, much more. And with an Imagewriter II printer you can see it all in dazzling color.

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Precision drawings? How about vertical and horizontal rulers with your choice of inches, centimeters, picas or pixels? Also, you can show the measurements of any object, precisely align objects using grids or guidelines, zoom-in, zoom-out — Cricket Draw has it ALL.

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"MindWrite?



Baaah!"

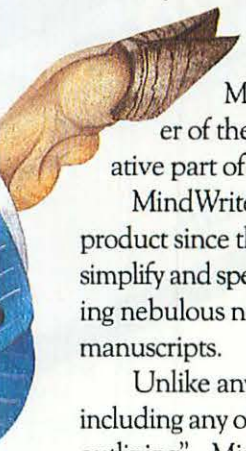
"It's too easy to use."

"They make a big deal out of features we can't find on the standard comparison charts."

"And at $125, it's suspiciously inexpensive. How can we take MindWrite seriously?"

If you make up your mind about MindWrite™ software without looking beyond the obvious conventional criteria, you'll miss the point, too.

The more you write, the more you'll like MindWrite.



Like no word processor before it, MindWrite focuses the power of the Macintosh™ on the creative part of the writing process.

MindWrite goes farther than any product since the Macintosh itself to simplify and speed up the process of turning nebulous notions into matchless manuscripts.

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Because whether you like to work from a quick list of catchwords or a precisely detailed blueprint, you can move effortlessly between outline and draft at any time. It's a simple matter of selecting a display option.

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And if you think nothing can be this simple, you're almost right.

Nothing *else* is this simple.

The more you rewrite, the more you'll like MindWrite.

If you want to move a MindWrite paragraph, for example, just select it with the mouse and drag it to its new location.

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Ten thousand pages, take it or leave it.



For those of you going places, here's a little something that solves big storage problems in the time it takes to say "who has the Farnsworth financial files?"

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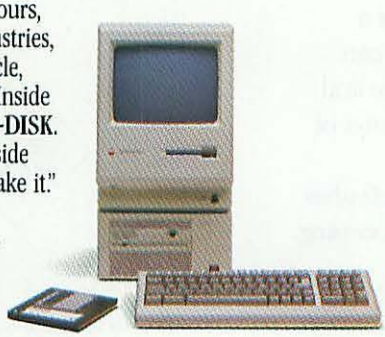
A rather revolutionary Bering 20 mb Bernoulli compact disk drive system for Macintosh computers. And, the first truly *portable* 5¼" system. One that lets you tote around 10,000 pages of data on a sleek cartridge about the size of a piece of bread.

Translated, that's 25 times the storage you get on one standard floppy.

Yet unlike floppies, the Totem is no slouch for speed. It's just as fast as a hard disk. In fact, your computer will think it's a hard disk. You can even share it with co-workers. And its advanced Bernoulli aerodynamics make it resist head crashing. If you've ever used hard disks, you know what a pain that can be.

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Last, but certainly not least, there's a whole family of Totem drives to choose from. They're all in the brochure. To get yours, write or call Bering Industries, Inc., 280 Technology Circle, Scotts Valley, CA 95066. Inside California, call 800 533-DISK. Call 800 BERING 1 outside California. Just say "I'll take it."



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Circle 627 on reader service card



Opening a New Frontier

A first look at the new trailblazing Macs offers a glimpse of the future

Apple has done, as the enigmatic figure in the film *2010* reported, "something wonderful." So wonderful, in fact, that it's hard to keep all the new products straight. That's a point of pride for Apple. "It's hard to put your arms around all of the potential," says Jean-Louis Gassée, Apple's vice president of product development.

What's he talking about? Two new Macintoshes, a host of peripherals from Apple, access to UNIX and MS-DOS operating systems, and a flock of new products from third-party developers. A lot of this new wave isn't ready to be shown, let alone used. Still, there are many real, working products. My quandary is what to say about them.

I've tried to resist the urge to gush, but I can't fight a gut-level desire to wax enthusiastic. So here goes; call the neighbors and wake the kids. Cynics should bail out now and check this space in June or July when the bugs and problems have become evident. This is a first-blush review.

The Macintosh II is on this month's cover; it's so good that it will overshadow the SE, which is a pity because the SE fulfills much of the Mac's promise, refining an already admirable product heritage. Moreover, the SE will be the first to roll off the assembly line in any quantity. I wanted to see how the box would perform, so I went over to a friend's house to "borrow" his SE for a couple of hours. First off, it wouldn't break. I loaded *MacWrite, MacPaint, MacDraw, FullPaint, Microsoft File, More, MicroPhone, Maze Wars,* OWL International's *Guide,* Beck-Tech's *MacMovies,* Think Technologies' *InBox,* Diehl's *MiniCAD,* and that invaluable desk accessory, *Moose Phrases* with MacInTalk.

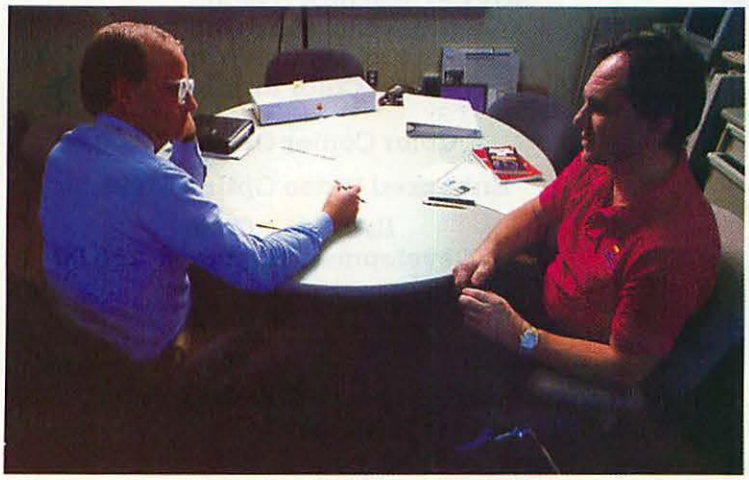
Then I dropped in about 5 megabytes of files. The SE bombed only once the entire time I was using the system, and I'm hard on machines: multiple System files, clicking the mouse too quickly and too many times, making errors. I connected my external SCSI drive, but it wouldn't boot because I had a system set to default for a large screen. The smiling face did come up, however, so I assume that I could have run the drive if I'd had the time to remove the default start-up system. I later found that extra hard drives (the SE I used had a 20MB internal drive) can be easily configured from a dialog box.

Overall, the SE is a pleasure to use and suprisingly quick to respond, like General Computer's HyperDrive 2000. The new keyboard feels good, and the mouse is speedy—much improved. Business users with spreadsheets should be pleased: I reorganized and manipulated files instantaneously. True, I only had an 8K file of 75 names and addresses; when I changed the font on a 39K text file I could easily have gone away for a coffee break.

In general then, the SE's speed improvements are in increments, not orders of magnitude. But the internal disk, the expansion slot, and the physical design changes make this the machine for the office. The SE keeps the original vision of the Mac alive by giving you everything you need in one small, well-designed, easy-to-use package.

The little touches—the Trash Can that fattens when full, better cleanup functions—made me feel that Apple cares enough

(continues)



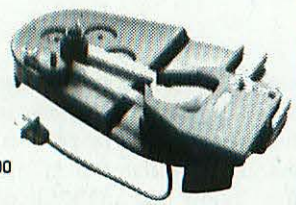
Apple's Jean-Louis Gassée talks about his new babies.

PHOTOGRAPHS BY GEORGE STEINMETZ

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Really 100% Hayes* compatible ■ 300/1200 baud. Speaker. Front Panel Lights. ■ 24 months warranty.



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Super Color for your MAC.

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■ Connects directly to the serial port. **No internal connections.**
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■ **Print on the Imagewriter II** using a 4 color ribbon... or get the
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about the long-term health of the Macintosh to spend resources on the less obvious aspects of the machine. Sadly, there is no upgrade path for owners of previous Macintosh machines, because the entire machine has changed. No doubt third parties will prosper by devising upgrades for the 512KE and the Plus.

The first thing that struck me about the Mac II: the graphics. A lot of craft is evident in the software extensions to the Toolbox and QuickDraw. The technique that very effectively enables the Mac screen to simulate a photographic-quality color display shows real software panache. Gray scale is even more effective than color. We now have to recognize that display *quality* is determined by factors other than the dots per inch or the number of picture elements on a screen.

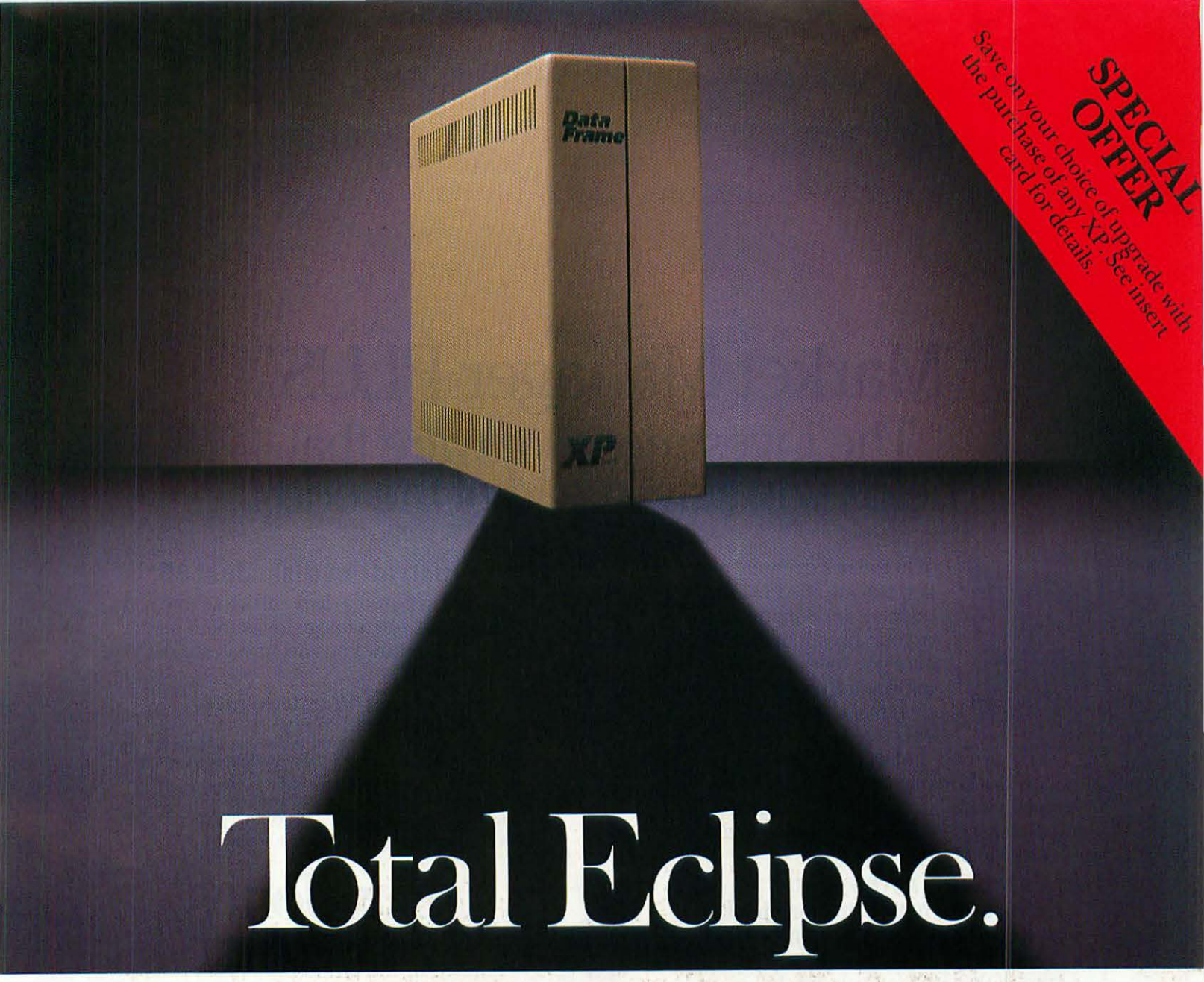
The sound chip is neat, too: Apple's engineers have the depth of talent to pull off designing a custom sound chip. I can't wait for voice synthesis, music, and games applications to exploit this capability. Graphics and sound—score two for the development team.

The most significant aspect of the Mac II's design, however, is a subtle one: Apple's selection of a little-known and relatively untried bus architecture. The choice of NuBus should be applauded. Apple could have gone the Intel/IBM route and chosen a nonstandard bus based on the signals of a microprocessor. Instead, the company chose to risk—and benefit from—a more ambitious approach. Because of the NuBus design, the Mac II's slots may last for a decade. Score three for the Mac II.

The machine itself is a pleasant package for those who can afford it—internal hard disk storage, easy access to the inside of the machine, easy-to-add memory upgrades, no irritating DIP switches to flip for different configurations, a simple upgrade to floating-point, and UNIX (which requires a memory-management chip). That's four.

And it's fast. A computer with horsepower... a hot-rod dream. No doubt engineers and designers out there will be

(continues)



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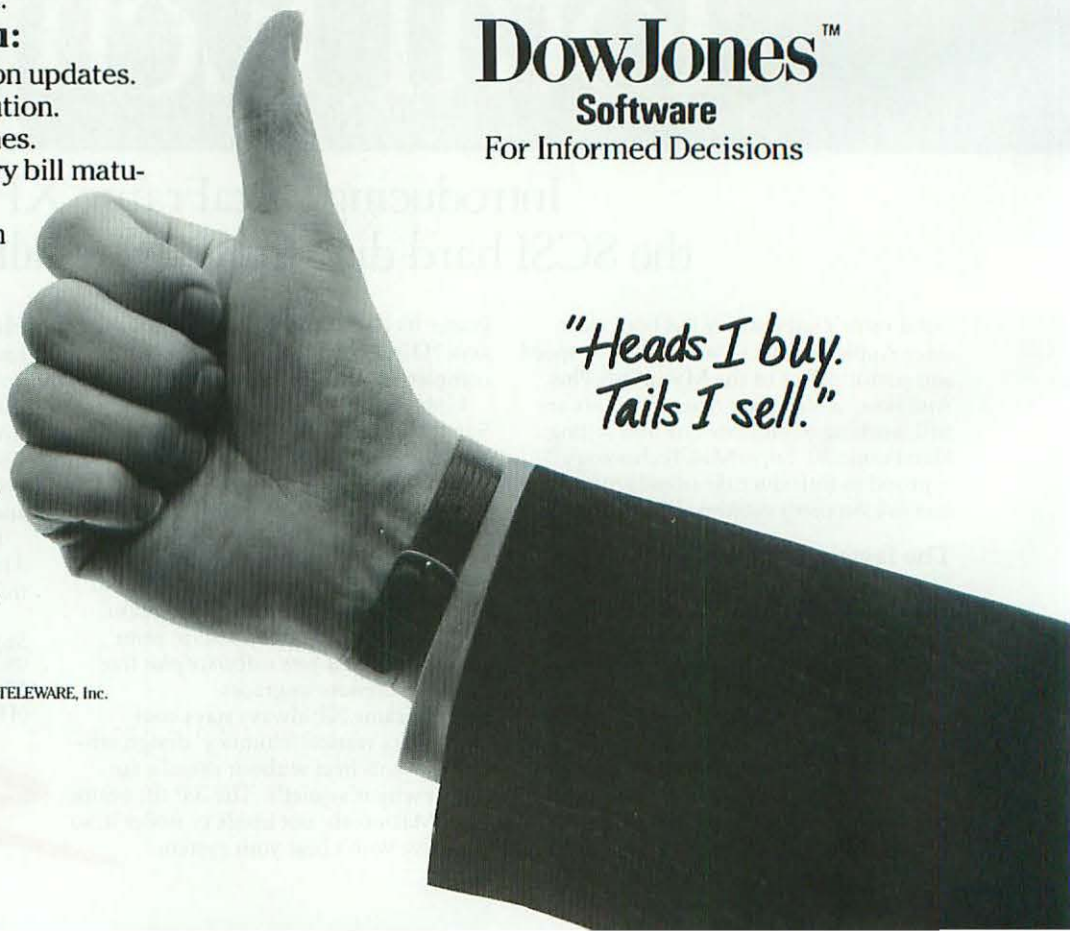
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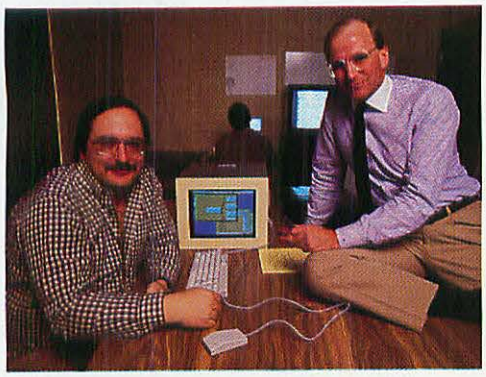
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Dave Winer of Living Videotext presents More *in color.*

swearing by the Mac II before the end of the year. The scope of add-on cards for the machine will be dramatic: 8- and 16MB memory cards, image capture and processing cards, high-speed array processors, communications cards for multiple network connections. My techie cup runneth over.

Best of all, Apple seems to have learned from the problems of the IBM PC family of products, a confusing array that leaves users wondering which graphics card is required for a given application and which monitors work with it. Independent ROM software written by clone manufacturers in the PC market has reduced software developers to maintenance engineers. In short, the standard-setter lost control of its market.

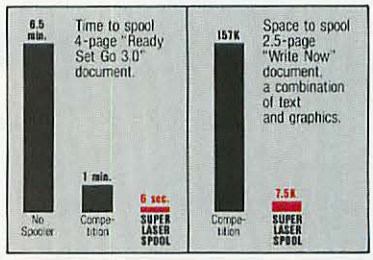
Apple won't allow any clone manufacturers in the market, so the company enters the open-architecture fray with an advantage. It also has a development environment and support network for programmers, which will bring us products that we haven't even dreamed of yet.

Still, this will be a year of problems and promise. One equal to 1982 through 1983 in the IBM market, says David Winer of Living Videotext. Apple has had three years to establish standards and an orderly universe of peripherals. But the enthusiasm of third-party developers will be like a gold rush, which Apple will find hard to control. □



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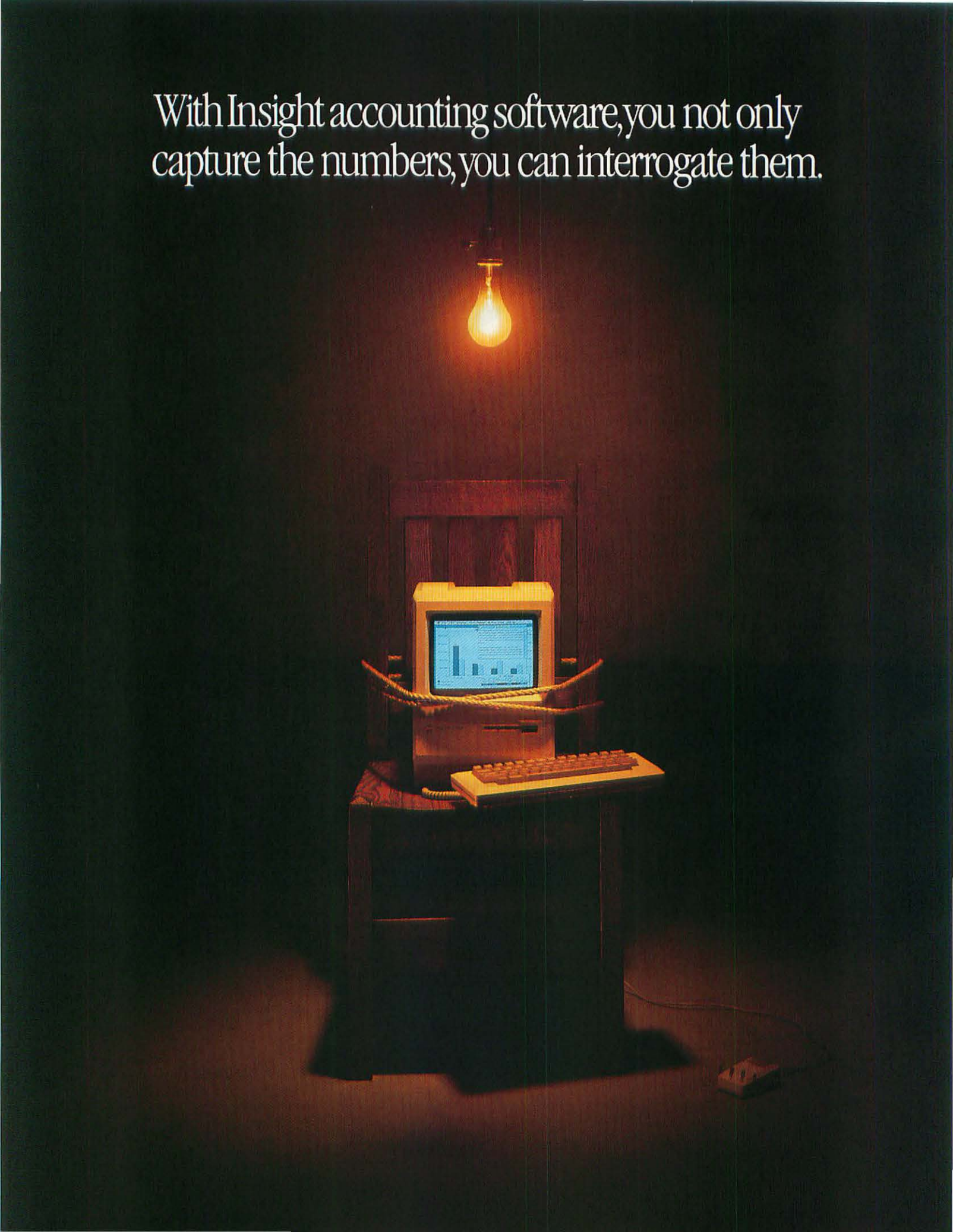
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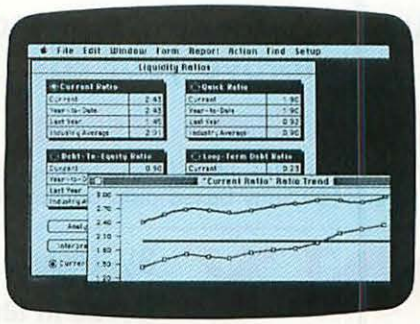
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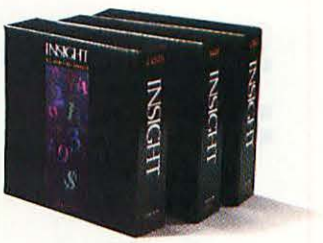


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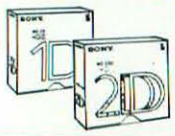
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Contributors Notes

Daniel Ben-Horin *("Insights on Red Ryder") is a San Francisco journalist and computer consultant. His work has appeared in* The New York Times, Redbook, *and* Mother Jones, *and he is a regular contributor to* Macworld.

Bencion Calica *("Mac Troubleshooting Tools") is president of Tools for the Mind, a firm that teaches business people in the New England area how to run the Mac. He coauthored* The Macintosh Advisor, *published last year by Hayden.*

Cynthia W. Harriman *("Mac Troubleshooting Tools") is coauthor of* The Macintosh Advisor *and director of the Boston Computer Society Summer Institute. After years of teaching people to use* 1-2-3, *she now specializes in training them on* Excel.

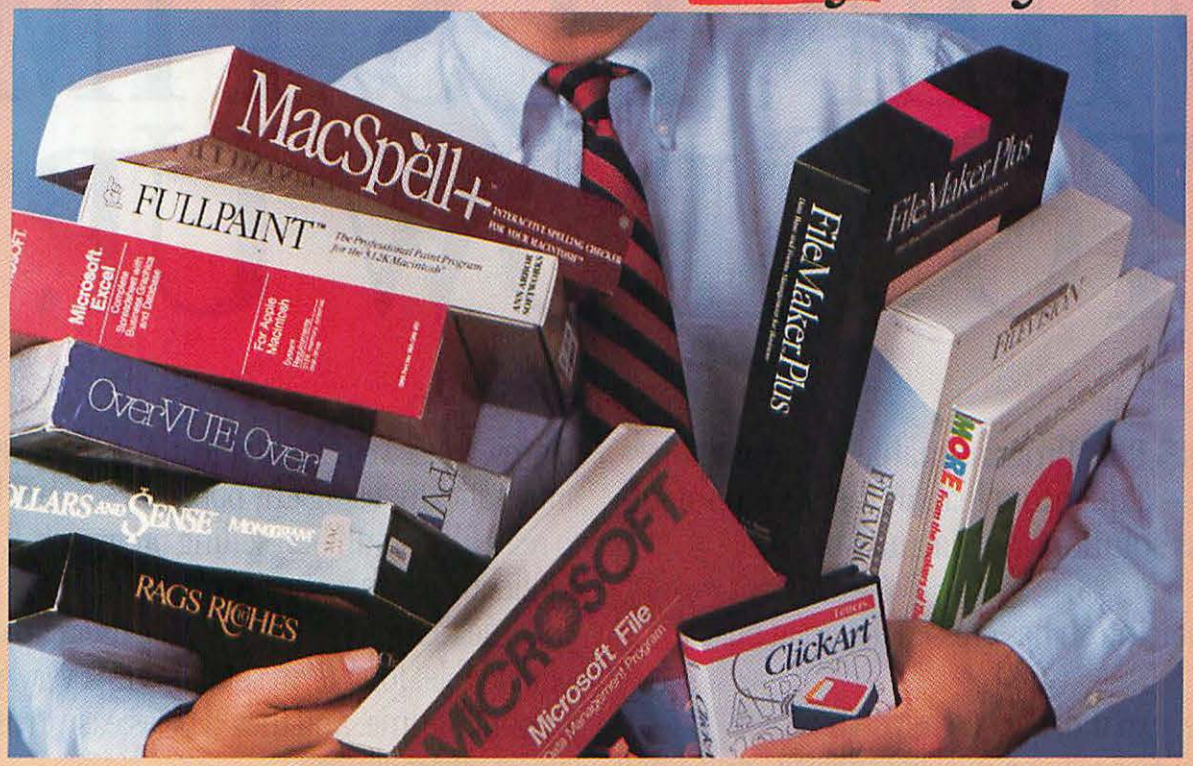
Erfert Nielson *("April Fooleries") has been fooling with the Mac since the dawn of* Macworld. *With this article, she has discovered a practical (or at least lucrative) outlet for her talents as a practical joker.*

Lon Poole *("More than a Plus" and "An Open Forum") answers readers' questions every month in his* Quick Tips *column. His Mac books include* Mac Insights, *a collection of tips recently published by Microsoft Press.*

Tom Saxton *("Mac Desktop Tools") is a Ph.D. candidate in mathematics at the University of Utah. He has taught math and computer science and has been using a Mac for more than two years.*

Charles Seiter *("Insights on Red Ryder") telecommutes from his woodland home in Willits, California. His published works include* The Skeptical Consumer's Guide to Used Computers *from Ten Speed Press, and books on Pascal and computerized financial planning for Addison-Wesley.* □

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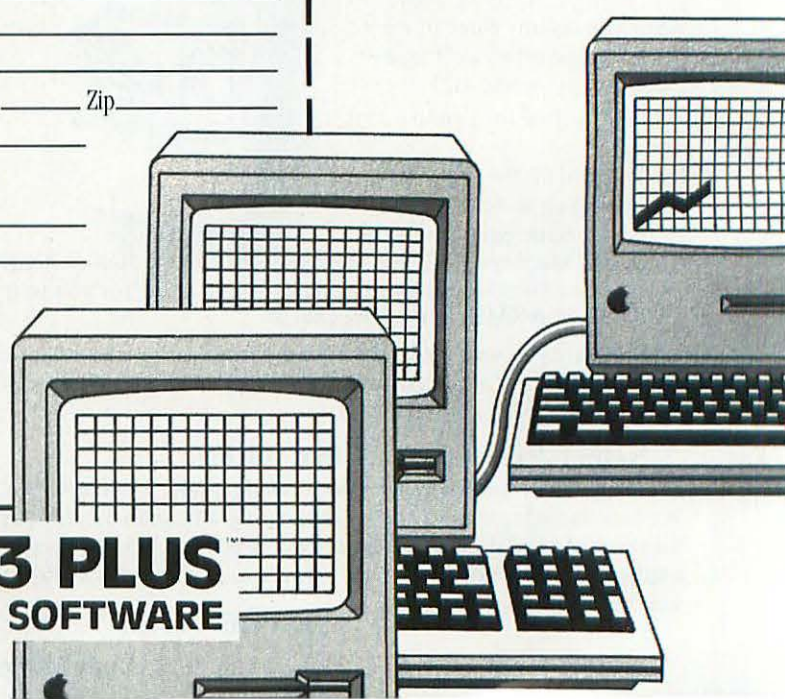
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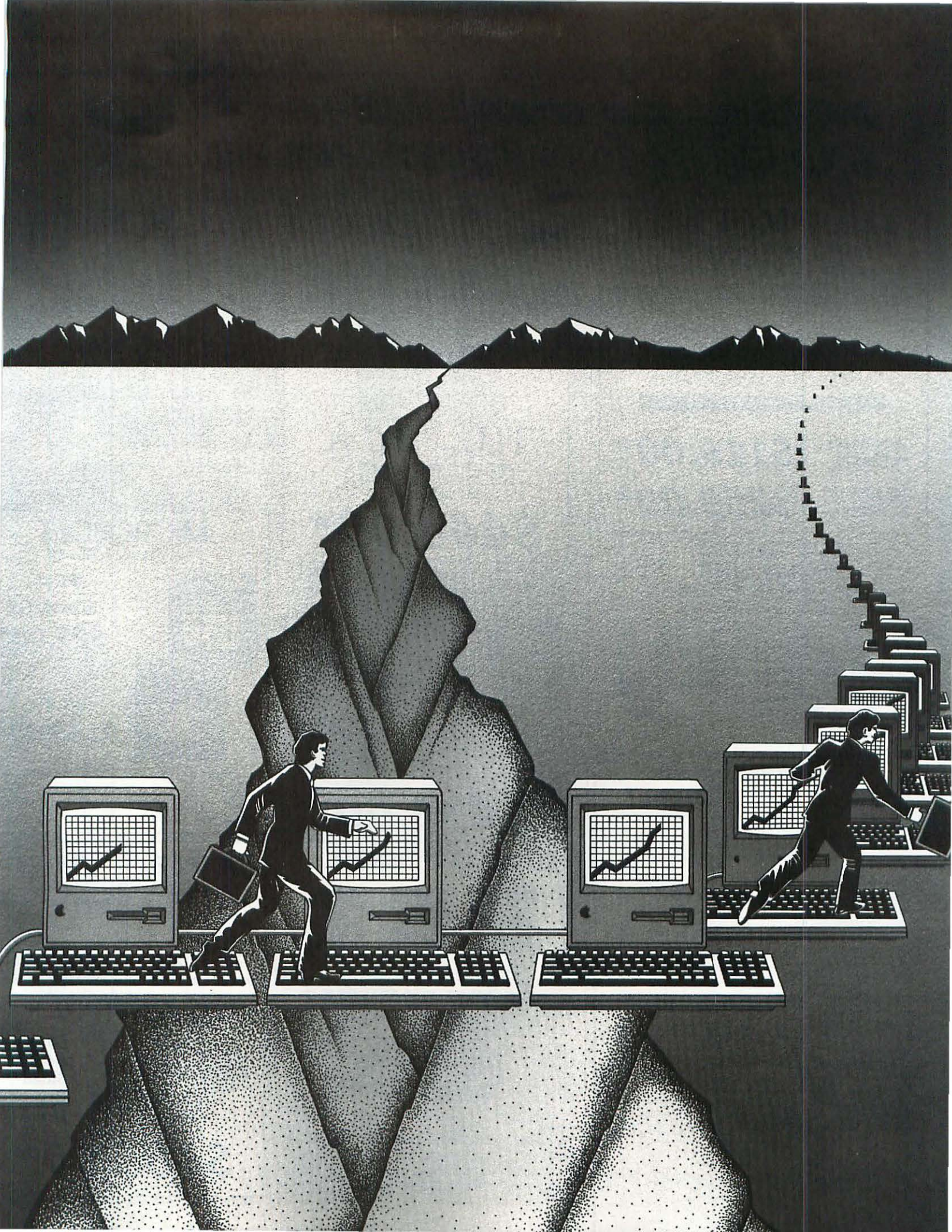
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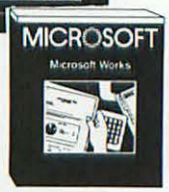
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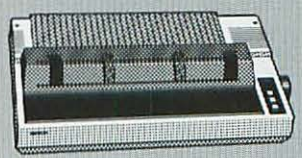
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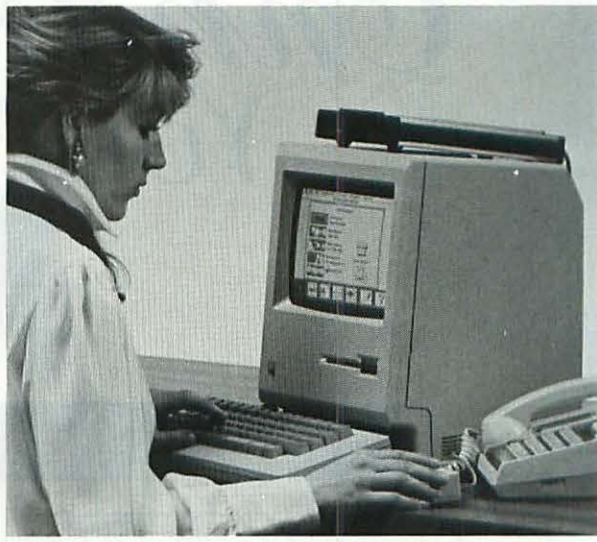
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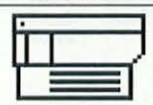
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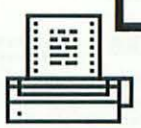


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Steven Levy

The Problem with Shareware

The fault, dear Mac owners, lies not in the software but in ourselves.



MAX SEABAUGH

I have a hard disk and a Mac Plus. She has a 512K Mac and an antique 400K external drive. It is difficult, if not tortuous, for her to make frequent backups of the lengthy chapters of her book; it requires a lot of time-consuming, wrist-stressing disk swapping. The solution is for me to feed her disks into my Plus, copying them to my hard disk and then transferring the information to 800K floppies. Despite my sanctimonious lectures on the virtues of frequent backup, we collaborate on this process much more occasionally than is prudent.

Our most recent backup session took place almost a month after the previous one. Everything was proceeding nicely. I had it down to a science: shove in the floppy, select the files, drag them to a folder on the hard disk, and finally drag the floppy's icon to the trash icon to eject the disk. Then to the next disk. I admit to a trancelike state that often comes with repetitive tasks. But the trance was abruptly terminated when I looked up and noted with horror that the disk I was just ejecting *had nothing on it,* though a few seconds before, it did. I checked the trash icon: nothing. I put the disk back in and still, nothing on it. Nada. Ank-blay. A chapter was missing. A long chapter. Obviously, I had dragged the file to the trash instead of the folder, and then, when I had ejected the disk, the Mac had emptied the trash.

Have you ever had to break the news to a writer that you've mistakenly discarded an 80-page chapter of her book? I do not recommend it. The only thing that saved me from violent injury was the hope I held out to the victim: I had heard of a program that could magically rescue lost files such as this one. And if my hands were broken, I could not work my computer to perform that task.

The program was named *Fedit,* and as I remembered, it was a shareware program. Shareware is a system whereby software is distributed freely, through bulletin boards, user groups, and informal giveaways. But it is not free: those who keep the program and use it are expected to send the author a specified payment.

Considering the alternative, money was no object. So I used my modem to call CompuServe and sure enough, there was *Fedit,* which I immediately downloaded. But when I opened the program, the first thing facing me was a message that this version of *Fedit* was not the latest; the Mac Plus version of the program—named *Fedit Plus*—had been taken out of the shareware loop and was available only by mail order.

This was quite a blow. I needed the best recovery program, as soon as possible. I panicked and called up the gurus at *Macworld,* who told me that they had a

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copy of *Fedit Plus* in the office, and there was a good chance that the program would help me out. They promised to Fed-Ex me a copy of the new version on the condition that I promise to pay the author, a fellow named John Mitchell. Though the magazine's policy has always been antipiracy, they made a point of repeating this condition, telling me that Mitchell had suffered in the shareware market.

Not to worry. "At this point," I said, "I would give him my firstborn."

Fedit Plus arrived, and within 15 tense minutes, the chapter was resurrected. Now I know how Ray Knight felt in last year's World Series—I had gone from goat to hero.

Fedit Be

John Mitchell was suddenly one of my favorite humans. But one thing puzzled me. I knew that his program had enjoyed wide distribution. And I had seen its incalculable value. So why had the program's performance in the shareware market apparently been so poor that he moved it into the commercial sector?

I called the author for the answers to these questions. Mitchell is an affable Englishman who came to this country in the late sixties and worked in the data processing division of a large company. The micro revolution of the seventies fascinated him, and he began working on personal computer products in his spare time. In 1984, he had just finished a contract project for Apple—designing the RGB monitor card for the IIe—when he became enamored of the new Macintosh. While learning to program the Mac, he developed a need to edit his files and perform recovery operations on his Mac floppies, so he wrote the first version of *Fedit* as a personal tool. He realized that others might benefit from that program, too. And that he might garner some well-earned remuneration from it.

"I talked to some publishers, but nobody wanted to release it commercially," says Mitchell. "They didn't think there was much of a market for Macintosh utilities. So I thought, 'What the heck, I'll put it on the market as shareware!' I had nothing to lose."

In fact, all of us had something to gain. Many people, myself among them, viewed shareware as a nearly utopian solution to the dilemma of programmers who feel that they lose control of both their work and their ideals when they turn over their products to commercial distributors. In the world of IBM-standard microcomputers, shareware artists/entrepreneurs with word processors, databases, and communications programs had been boasting impressive revenues from honorable customers. In light of the early success of the state-of-the-art *Red Ryder* communications program, the Macintosh looked like the machine that would make shareware a model for innovative capitalism.

Indeed, at the November 1984 Hacker Conference, shareware was one of the hottest topics. Bob Wallace, author of the *PC-Write* word processor, announced that his program would do $225,000 worth of business that year. In addition, he had total control of his program and the benefit of rich feedback from his users.

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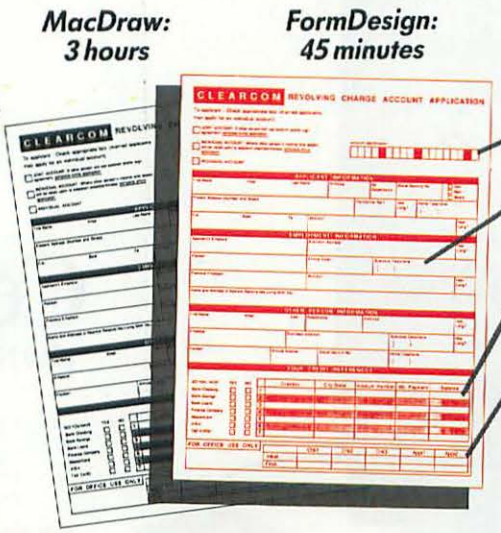
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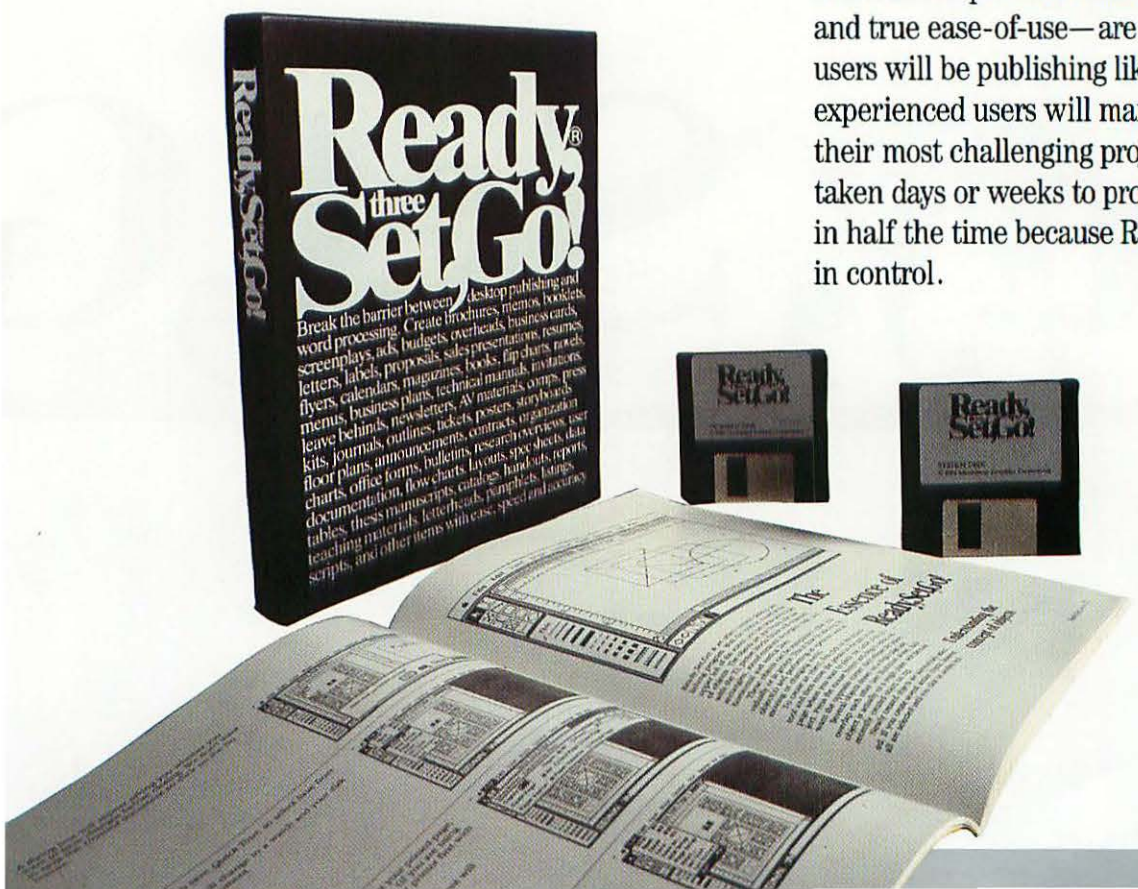
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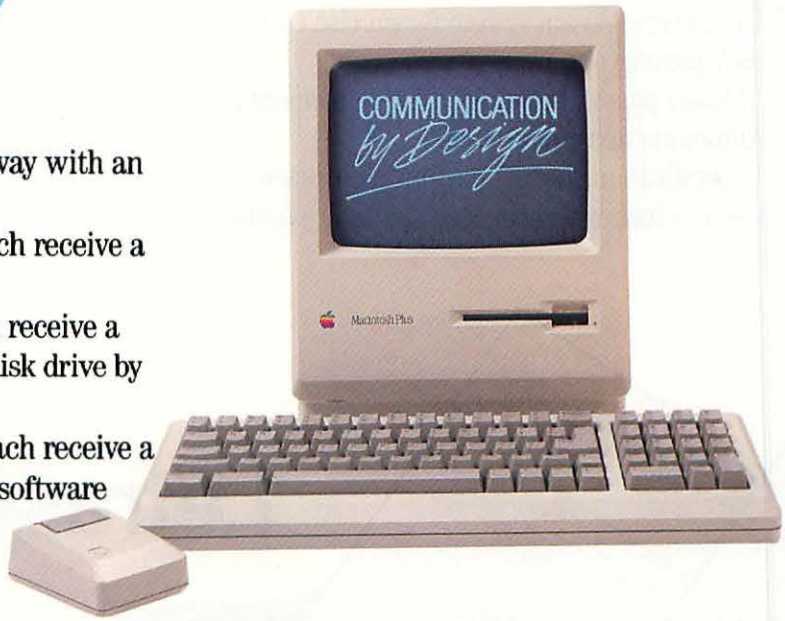


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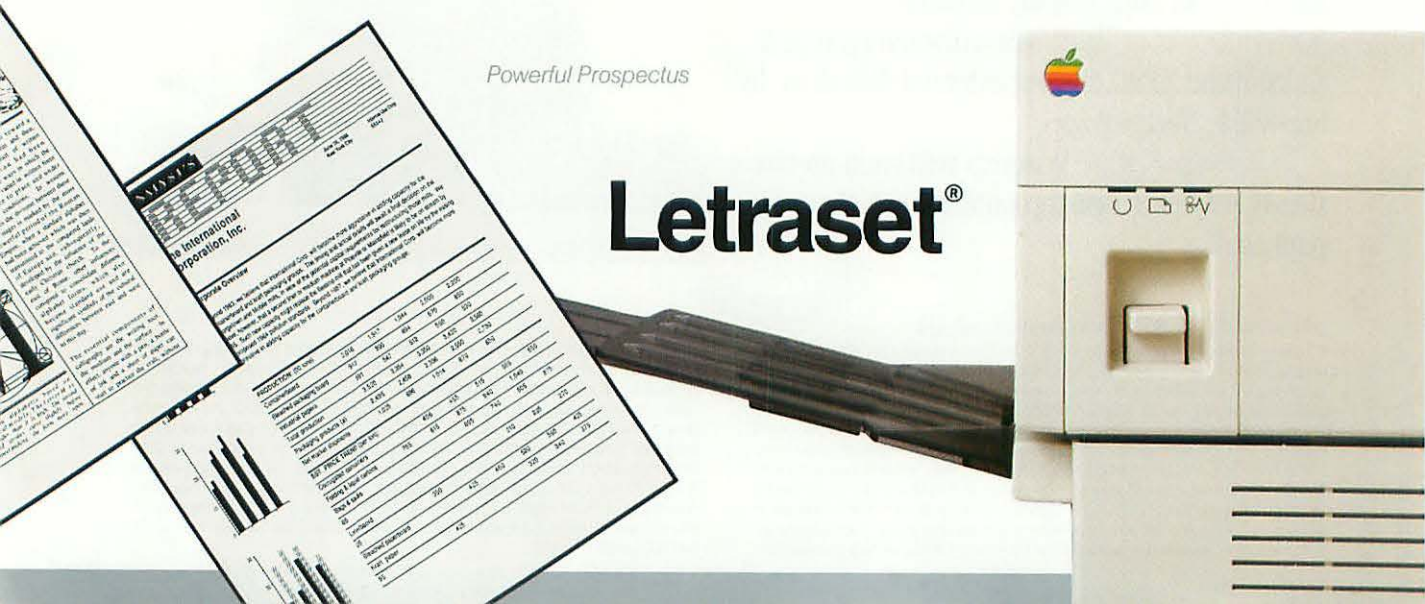
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For users, shareware was unbeatable. For no cost, they could test the program—the full-featured program, not a crippled demo—and see if it was worth the expense. In any case, the price of a shareware program—unburdened by expensive marketing and distribution costs—was almost always much lower than a comparable commercial program. All that was required from the user was honesty. If you use the program, pay for it.

By that measure, shareware could be seen as a test of the user. The marketplace gets the software it deserves. Is it worthy of a rich base of shareware software?

A Question of Honor

If *Fedit* is the example, the answer is no. In September 1984, John Mitchell made the program available. On it was a message to users: try the program, and if you want to keep it, send Mitchell $30. If not, erase the program from your disk.

Distribution was widespread. Macintosh users could get *Fedit* from bulletin boards, user groups, or friends. Apple Computer distributed it to developers with the shareware message on it. The program got positive mentions in relevant publications. Mitchell wrote updates, extending the program's powers. *Fedit* saved thousands of people's skins, much as it saved mine. Mitchell estimates that as many as 20,000 people used it between its release date and December 1985. And how many of those thousands sent in the reasonable $30 registration fee?

Two hundred and fifteen.

Why the miserable response? Are Macintosh users ungrateful? John Mitchell refuses to be harsh with them.

"People have short memories. It's difficult to send a letter and put money in. Most of the people who did respond were professionals, doctors or lawyers who have secretaries to do that kind of work for them."

Other shareware developers concur: people don't consciously stiff the authors. It just winds up that way.

"Procrastination is the biggest problem with shareware," says Dick Skeie, who with Don Brown runs CE Software, the shareware publisher of the original Mac desk accessory *Mover* and the *Mock* series of applications. "With conventional products, you pay once, and if you've used it, you've used it. With shareware people say, 'When I've used it significantly, I'll pay for it.' It's a different concept."

Even when use is significant, CE Software's MacHonor System shows honor to be a rare commodity. Though Skeie and Brown are circumspect with hard figures, they admit that the revenues from those products do little justice to their widespread popularity in the Mac marketplace. "I'd guess that between 2 and 5 percent of people actively using the programs pay us," says Brown. "And that's not good."

Of all the major shareware developers, the only one who seems to be doing a land-office business is Scott Watson, creator of *Red Ryder*. This is partly because people are more willing to send in money for applications that get frequent, perhaps daily, use. Also, those who rely on a program for their work are more likely to need the free or low-cost upgrades that are commonly provided to shareware owners who

(continues)

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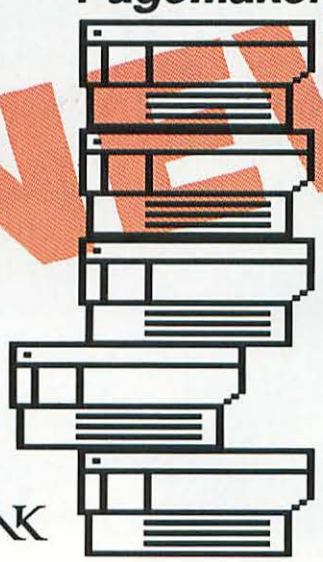
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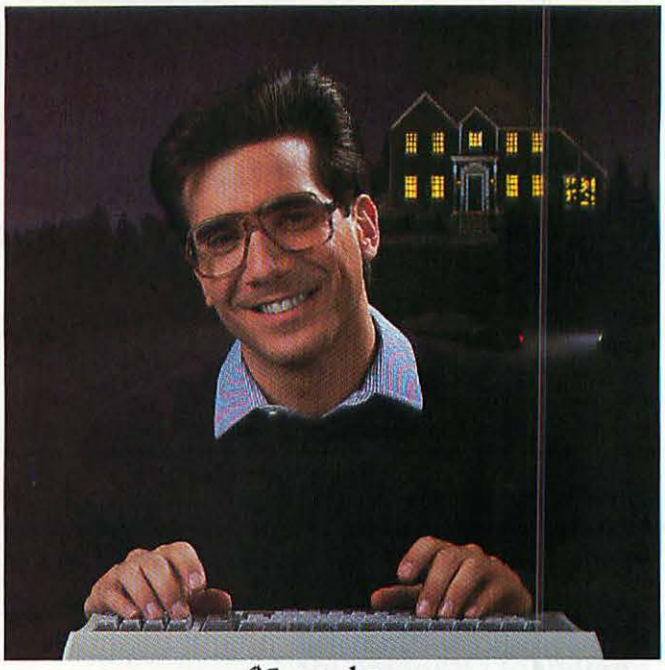
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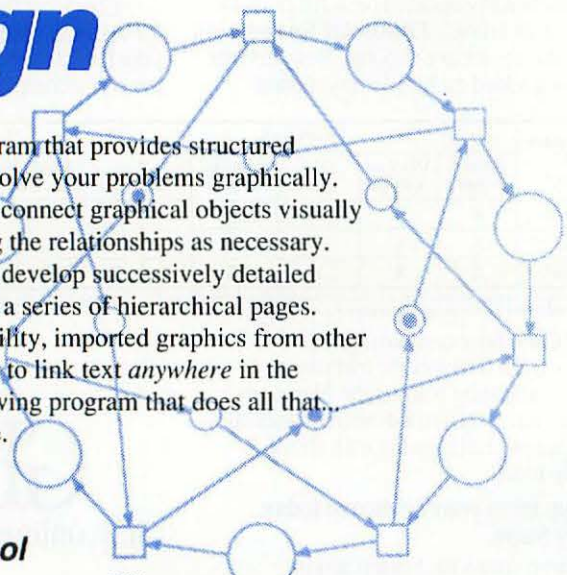
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pay to become registered users. Perhaps most of all, Watson's near-obsessive efforts in supporting his product have put *Red Ryder* in a category somewhere between shareware and cult item.

Most shareware programs, though, are either utilities, desk accessories, games, or subsets of applications. The vast majority fall under the *goodies* appellation. This has helped to give shareware a reputation, however undeserved, as unprofessional software.

Also, though some shareware programs are as good as those available commercially, many have bugs. Still others are half-formed programs that an author would be happy to give away but, as a what-the-heck attempt to make a few bucks, labels *shareware*. Dick Skeie notes that as a result of this, "The word *shareware* has taken on a connotation of being second-class software."

Which gives the procrastinators one more disincentive to pay.

Arrivederci, Shareware

So John Mitchell quit shareware completely. "I decided it just wasn't worth it," he said. "I decided to release no more versions in shareware, and I took the shareware notice off the previous versions. It was time to change philosophy completely and make it a commercial program." Turning down offers from a few publishers, he began his own small company. He does mail-order sales and has worked out an arrangement with some dealers. He has even begun advertising, "trying to publicize the fact that it really is a commerical program." Now, he says, he sells more copies of *Fedit* in a week than he did in the entire 15 months the program was in the shareware domain.

The folks at CE Software are not taking such a drastic step. "We exist for the people who do send in money, not for the ones who don't," says Dick Skeie. But the company has changed its approach. "We were forced to recognize reality. You can't just put something out there and sit back and wait for the money to come in. You have to provide incentives and make it as easy as possible for people to pay."

So CE has begun to assume a dual identity: while keeping a foot in the shareware world, it also packages its programs commercially and sells through dealers.

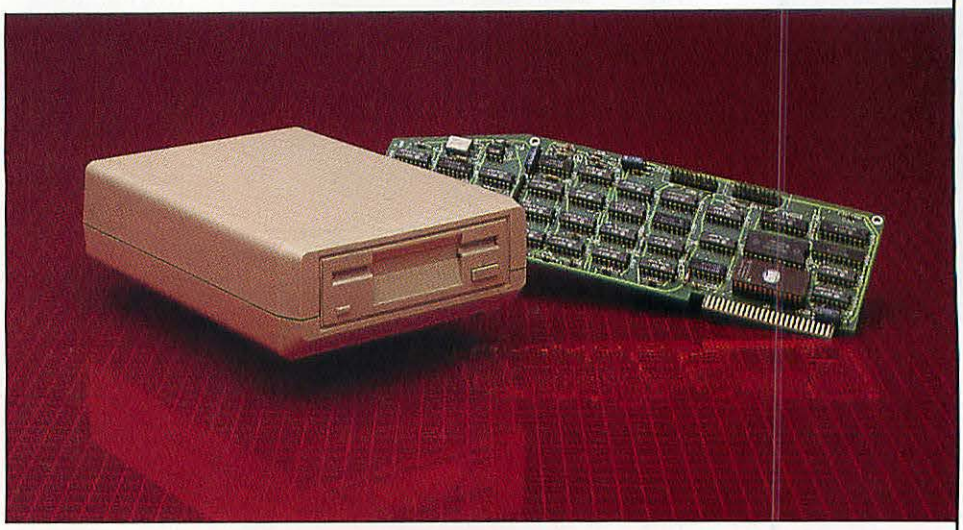
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Spelling Checkers

A.L.P. Systems MacProof V2.0	99.00
Batteries Included Thunder! *(Interactive Spelling Checker)*	28.00
Creighton Development MacSpell+ *(Requires 512K)*	55.00
EnterSet, Inc MacGas *(with Glossary & Thesaurus)*	55.00
Greene, Johnson Inc. Spellswell 1.3 *(60,000 word Dictionary!)*	50.00
Lundeen & Associates WorksPlus Spell	42.00
Target Software MacLightning 2.0 w/Merriam Webster Dictionary	53.00
Additional Thesaurus Library	29.00
Medical Dictionary or Legal Dictionary	53.00

Desktop Publishing

Boston Software Publishers The MacPublisher II	139.00
Mac-Hy-Phen	69.00
MacIndexer	62.00
Manhattan Graphics Ready, Set, Go!3	169.00
Ready, Set, Go! Desk Design	37.00
Orange Micro, Inc. Ragtime *(Integrated Page Processing)*	219.00
Solutions, Inc. Glue *("Print to Disk" Capability)*	42.00

Accounting Packages

BPI BPI Entry Series-General Accounting	129.00
Chang Labs *New Enhanced Version III Modules!* Rags to Riches GL, AR, or AP	125.00
Rags to Riches Three Pack-*(GL/AR/AP)*	299.00
Inventory Control	245.00
Professional Billing	245.00
Professional Three Pack-GL/Professional Billing/Payables	349.00
Digital, Etc. *Turbo* Maccountant	289.00
Monogram Dollars & $ense	81.00
Business Sense *(GL/AR/AP)*	339.00
Palantir GL, AR, or Inventory Control *(each)*	59.00
Peachtree Back To Basics GL, AP, or AR *(each)*	89.00
Back To Basics Three Pack *(GL/AR/AP)*	129.00
Sierra On-Line MacOneWrite CD, AR, or GL *(each)*	39.00
MacOneWrite Three Pack *(GL/AR/CD)*	59.00
Survivor Software MacMoney *(Financial Planner)*	49.00

Statistics Packages

BrainPower StatView 512 Plus	179.00
Cricket Software Statworks	79.00
Statware, Inc. Stat80 *(Professional)*	279.00
Systat Systat *(Version 3.0)*	459.00

Graphics Software

Altsys Corp. FONTastic	27.00
FONTastic *Plus*	52.00
Fontographer 2.2	249.00
Ann Arbor Softworks Full Paint	55.00
Apple Computer MacPaint	99.00
Brainpower Graphidex	69.00
Broderbund Print Shop	49.00
Toy Shop	41.00
Casady Company Fluent Fonts *(Two-Disk Set)*	29.00
Fluent Laser Fonts *Choice of: Bodoni, SanSerif, Ritz & Right Bank, Monterey, Caligraphy & Regency, or Prelude*	49.00
Dubl-Click Software World Class Fonts! Vol. 1 or Vol. 2	29.00
Hayden VideoWorks	59.00
Innovative Data Design Paste-Ease *(Volumes I & II)*	35.00
Miles Computing Mac The Knife Volume III or Volume IV	27.00
Mindscape ComicWorks	49.00
GraphicWorks	49.00
Silicon Beach Software SuperPaint	55.00
Silicon Press	42.00
Springboard Certificate Maker	36.00
Symmetry PictureBase	65.00
T/Maker Click Art Letters or Personal Graphics	29.00
Click Art Publications or Effects	29.00
Click Art Letters II or Click Art Holidays	29.00
Click Art Business Image	29.00
Click Art Laser Fonts: Plymouth, Bombay, or Seville *(each)*	52.00

CAD Products

Apple Computer MacDraw	159.00
BrainPower DesignScope	129.00
Challenger Software Mac 3D *(Enhanced Version 2.0)*	129.00
Cricket Software Cricket Draw	179.00
Dreams Of The Phoenix Phoenix 3D Level One	35.00
Enabling Technologies Easy 3D	69.00
Professional 3D	199.00
Innovative Data Design MacDraft *(Updated Version 1.2)*	165.00
MicroSpot MacPlot	119.00
MacPlot Professional	234.00

Educational/Creative Software

Addison Wesley Puppy Love	14.00
Baudeville Ted Bear Discovers...Rainy Day Games	20.00
Guitar Wizard	20.00
Broderbund Sensei Geometry	65.00
Compu-Teach ArithMATIC, Word Pieces, or ABsCenes	28.00
Davidson & Associates Speed Reader II	39.00
Math Blaster or Word Attack!	28.00
Electronic Arts Pinball Construction Set	27.00
Deluxe Music Construction Set V2.0	64.00
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First Shapes	32.00
Great Wave Software KidsTime or TimeMasters	29.00
Hayden MusicWorks	32.00
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Score Improvement-Achievement Tests	59.00
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Learning Multiplan & Chart	39.00
Mindscape Perfect Score SAT w/The Perfect College	47.00

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Rubicon Publishing	
Dinner at Eight	35.00
Silver Palate Collection	29.00
Dinner at Eight-Silver Palate Bundle	59.00
Simon & Schuster Typing Tutor III	35.00
Paper Airplane Construction Set	24.00

Game Software

Accolade Hard Ball	25.00
Activision Shanghai or Hacker	27.00
Hacker II: The Doomsday Papers	32.00
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Broderbund Ancient Art of War	27.00
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AST-4000 *74 MB External Hard Disk with 60-MB Cartridge-Tape Backup for the Macintosh Plus.*	4699.00
Dove Computer Corporation	
MacSnap Model 524 *(512K to 1MB Upgrade)*	139.00
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Ehman Engineering	
800K Disk Drive	199.00
20HD *(20MB SCSI Hard Drive)*	Call
Iomega	
Single Cartridge Drives	
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Bernoulli Box 20MB w/SCSI	1199.00
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Bernoulli Box 2-10MB w/SCSI	1599.00
Bernoulli Box 2-20MB w/SCSI	1899.00
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20MB Cartridges *(3 Pack)*	239.00
Head Cleaning Kit	69.00
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LoDown 20/20 Combo *(20 MB Hard Disk w/20MB Tape)*	1439.00
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LoDown-30 *(30 Meg Hard Disk)*	999.00
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MaxSave *(Internal Recoverable Ram Disk For the MacPlus)*	79.00
MaxPack *(MaxPlus and MaxSave Bundle)*	329.00
MaxPort *("SCSI" Port for your Mac 512K)*	139.00
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Western Automation Labs	
Dasch External RAMdisk *(2048KB)*	439.00

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Hayes Microcomputing	
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Smartmodem 1200 Mac w/Smartcom II & Cable	429.00
Smartmodem 2400	579.00
Transet 1000-128K	269.00
Transet 1000-512K	359.00
Transet 1000 Mac Accessory Kit	31.00
Prometheus	
Promodem 1200 *(Hayes Compatible)*	279.00
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U.S. Robotics	
Courier 1200 *(Hayes Compatible)*	199.00
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C.Itoh Color Disks SS/DD *(box of 10)*	21.00
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BASF 3½" DS/DD Disks *(box of 5)*	12.00
Bulk *(Sony)* 3½" DS/DD *(10)*	19.00
Centech 3½" DS/DD Color Disks *(box of 10)*	24.00
Sony 3½" DS/DD Disks *(box of 10)*	23.00
Fuji 3½" DS/DD Disks *(box of 10)*	23.00
Maxell 3½" DS/DD Disks *(box of 10)*	23.00
Verbatim 3½" DS/DD Disks *(box of 10)*	25.00
3M 3½" DS/DD Disks *(box of 10)*	27.00
C.Itoh Color Disks DS/DD *(box of 10)*	29.00

Digitizers

AST	
TurboScan *(Optically Scans & Digitizes at 300 Dots-Per-Inch)*	1699.00
Kette Group	
MacNifty Audio Digitizer w/SoundCap	99.00
Koala Technologies Corp.	
KAT Graphics Tablet	139.00
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Flip 'n' File/Micro	9.00
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The Pocket Pack *(holds 6 disks)*	9.00
The Disk Directory *(holds 32 disks)*	18.00
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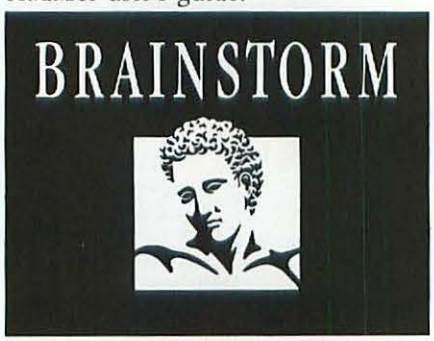
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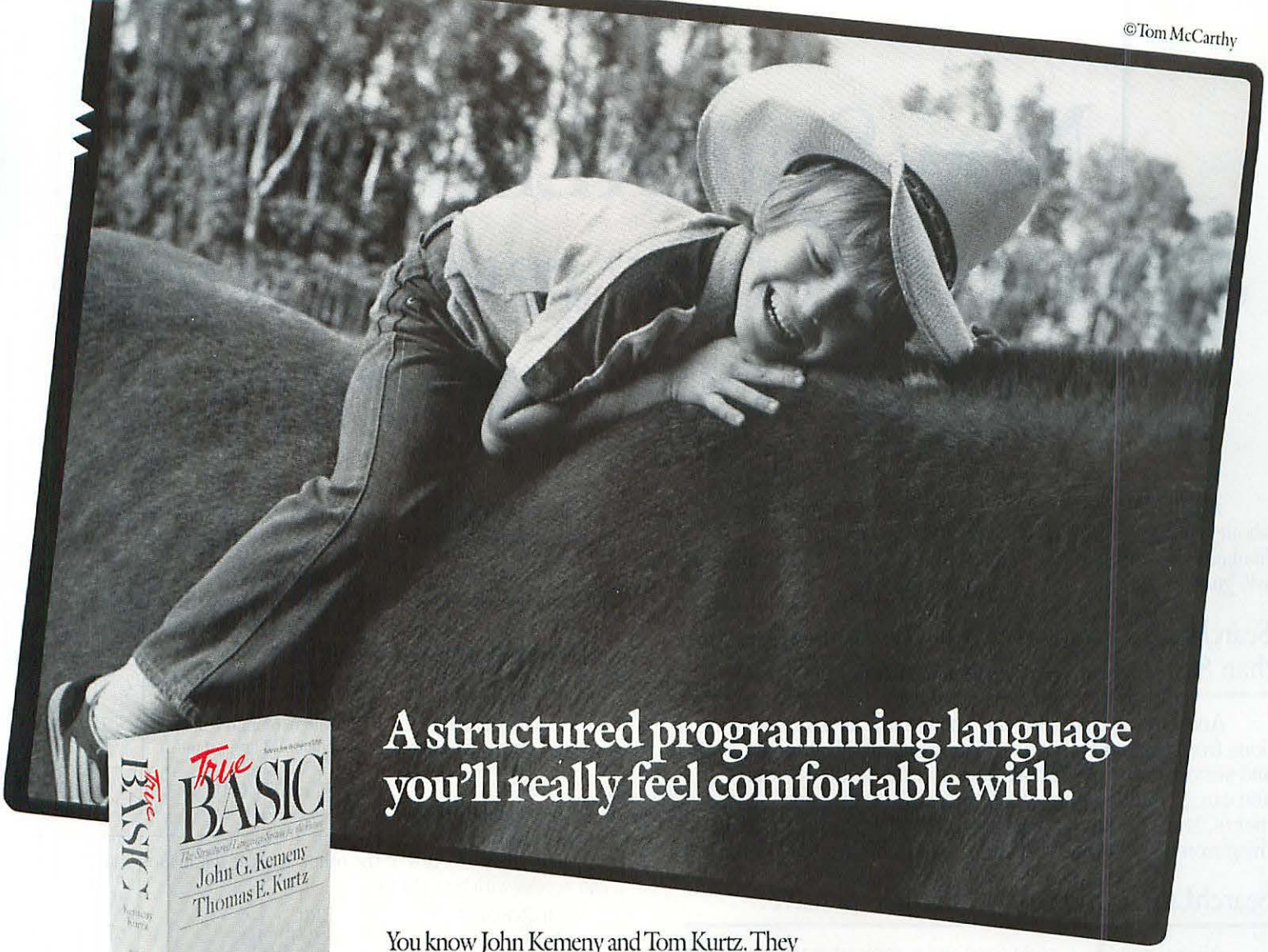
Each of the packages sent to paid users contains a bonus program, which is not distributed through shareware channels. For instance, CE's *Billboard* graphics program is distributed by shareware, but only paid users are entitled to the accompanying *MacBanner,* which creates and prints large banners.

Al Evans, the creator of *Captain Magneto,* perhaps the most popular shareware game, takes a different approach. He intentionally bogs down his otherwise delightful program by embedding invoices; every so often, the game grinds to a halt and the player is forced to sit through a message urging users to cough up $20. Like many commericals, the messages are amusing once or twice and infuriating the twentieth time. Evans, who finds the shareware system emotionally if not fiscally rewarding, estimates that less than 2 percent or so of *Magneto* players have sent in the cash to get the passwords that eliminate the interruptions–and were it not for the commercials, the response would be even worse.

Even Scott Watson's handling of *Red Ryder* has evolved to give more incentives to pay up. Registered users are eligible for the latest upgrades weeks before they are available to everybody else. And whereas previously you obtained the documentation by printing out a file, now registered users receive a nicely bound, professionally printed manual.

All in all, I think these are reasonable responses from shareware suppliers–perhaps even overly generous. Check out the catalog of your local user group, the data libraries on CompuServe, or *Where to Buy;* you'll find that you can still obtain a wealth of shareware. This bespeaks a considerable optimism on behalf of software authors, an optimism that so far is generally unfounded. The problem is not theirs, though–it is ours. I need not strain for an example: it is two weeks since my disaster with the lost chapter and I have yet to purchase that copy of *Fedit Plus* that meant so much to me when I needed it.

I will buy it, though. Tomorrow. I promise. Meanwhile, the dream of shareware slowly fades away. □



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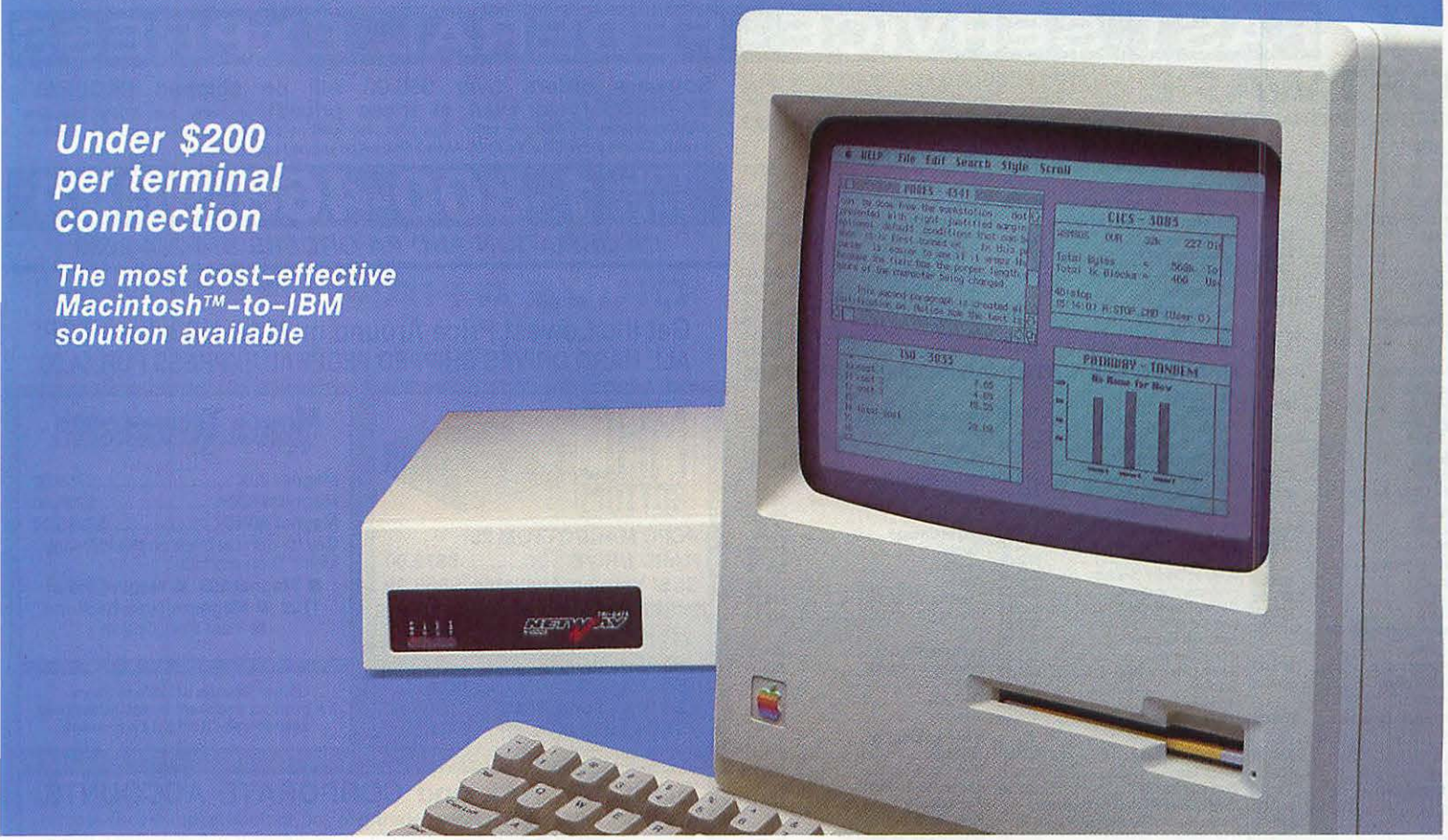
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Switcher™ Compatible – NETWAY 1000A's terminal personality operates under Switcher, allowing you to switch between an IBM host session and a Macintosh application without disconnecting from the host. Using copy/paste, you can transfer IBM host data into a Macintosh application with a few simple clicks of the mouse.

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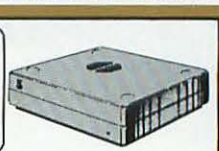
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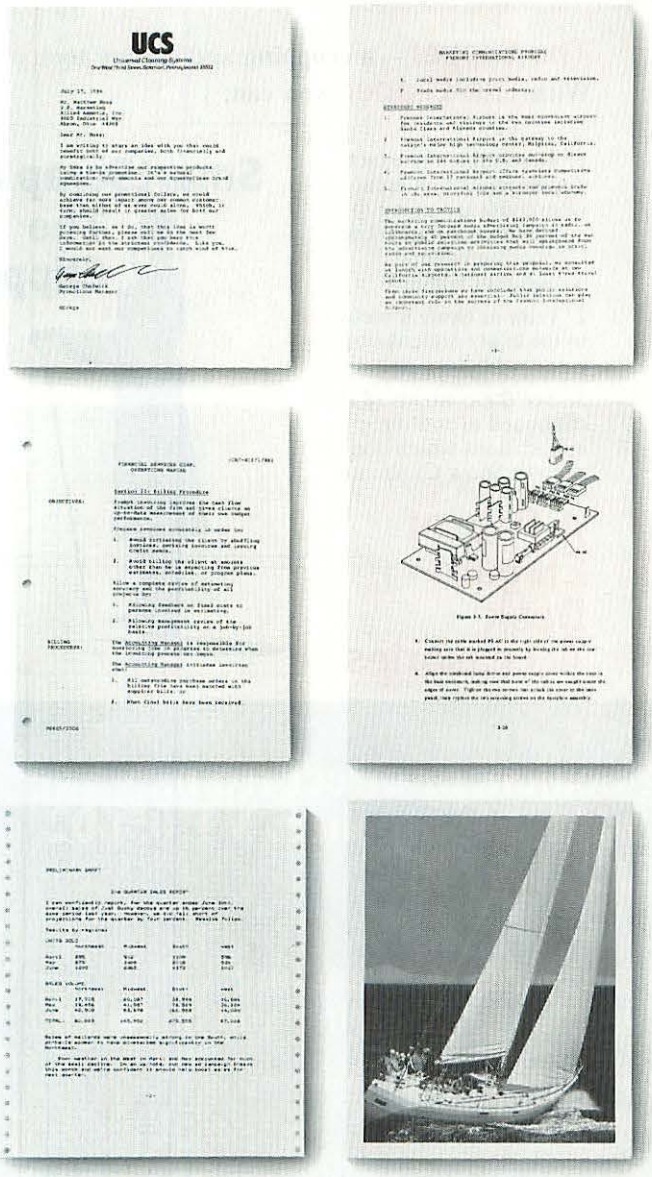
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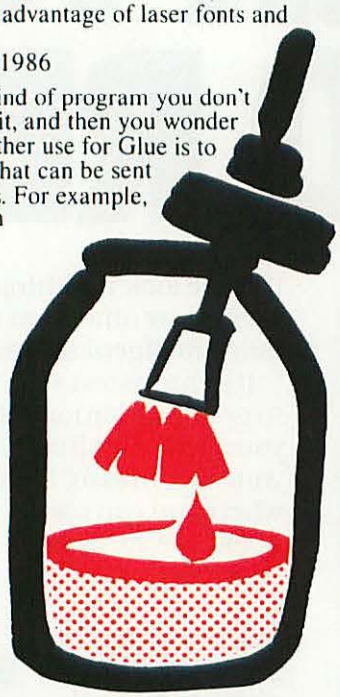
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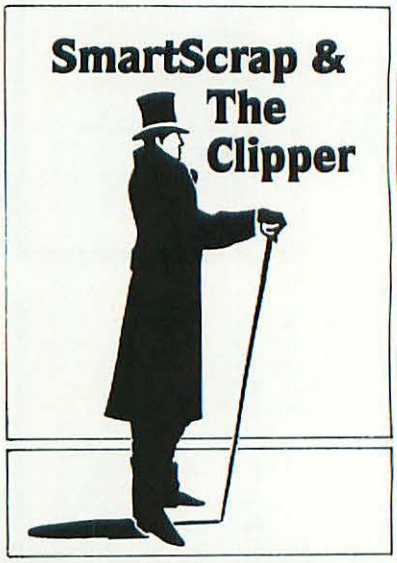
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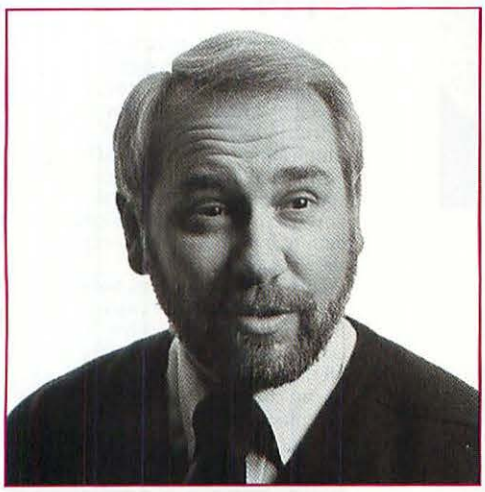
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Verbatim

An interview with Del Yocam, Apple Computer's chief operating officer



Born and raised in southern California, Delbert W. Yocam began his career in business with six years at the Ford Motor Company, at first in his familiar southern California stomping grounds. After a year and a half in the Dearborn, Michigan, office with over 100 other MBAs, Yocam decided the slow motion of the auto industry was not for him. He and his family returned to California, and he entered the field of computers and electronics, accumulating seven years of experience at such companies as Control Data Corporation, Bourns Incorporated, Computer Automation, and Fairchild Camera and Instrument Corporation. His boss at Computer Automation left to work for a start-up that was to become Apple Computer, and in November 1979 Yocam joined him. Starting as director of materials, he made his way through the management levels at Apple to his present top management position as chief operating officer.

What is the role of the COO at Apple?

I like John Sculley's definition best—that John is responsible for the growth of Apple Computer, and I am responsible for running Apple—everything that's pertinent to the business. There are many things I focus on. One that I may go overboard on is ensuring that we keep intact in our second decade many of the characteristics that made us successful in our first: entrepreneurship, technology, creativity, and innovation. Risk-taking. We need to act as if we have not done it before, keeping imagination and ideas alive and dynamic.

You are known at Apple as a "people person."

I was part of the team that established our "corporate credo" in 1981—the nine values that we want to promote and live by. All employees receive a copy when they join Apple. I even make a presentation to some of our new employees at orientation. I tell them that we want people who work more than from 9:00 to 5:00; not because the number of hours that they work is important, but because we want their jobs and this company to be important to them personally. I tell them that we don't want to wait three months to discover this; that if they don't want to make a commitment to Apple, if they don't have a passion for changing the world, they shouldn't stay.

Of course, commitment has to go both ways. Not only do we provide an exciting work environment, but we celebrate our togetherness—our work family—with departmental parties, Friday beer busts, and company communications meetings. For example, John Sculley and I took all of the employees in Cupertino to see *Star Trek IV* in December; we loaded people into buses and drove them to theaters. What other Fortune 500 company takes its employees out for an afternoon at the movies?

We also want our families to share in our celebrations; we include them in summer picnics, open houses, and other events thoughout the year.

Will there be any more major reorganizations at Apple?

I don't see that now. When I got back from my sabbatical last August, I made several changes. Advanced technology was separated from product development—the appointment of Larry Tessler as vice president for advanced technology is succeeding wildly. My second effort in reorganizing was the elevation of the MIS department. This group has strategic importance for Apple as a Fortune 500 company—one that will continue to grow and need sophisticated management information systems.

Along with those efforts I began thinking about Apple as a new-style corporation. In the past many companies have employed a traditional management approach: the top decision-maker provides all the decisions and the rest of us implement them. Well, that won't work in the future. Today, people have to buy into the work they perform, identify with it. Success in promoting this will make Apple a great company in 1990 and beyond. People need to have a commitment to create excellence.

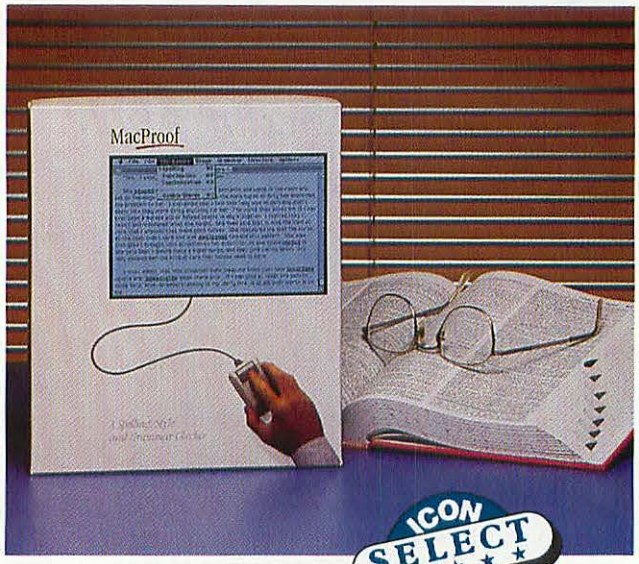
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MegaScreen II

From Micrographic Images

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The new, lower cost MegaScreen II doesn't just magnify your Mac's screen, it gives you more image to see. Its 19 1/2 inch screen measures 1024 x 900 pixels — five times the Mac's. Its capacity for text is unequaled: use MindWrite to spread out windows of text like sheets of paper on a desk, so you can see how paragraphs and pages fit together. Lay out full-sized pages with room left over for palettes and pasteboards.

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frees you to be more creative. In fact, the more hours you spend in front of your Mac, the more valuable the MegaScreen is.

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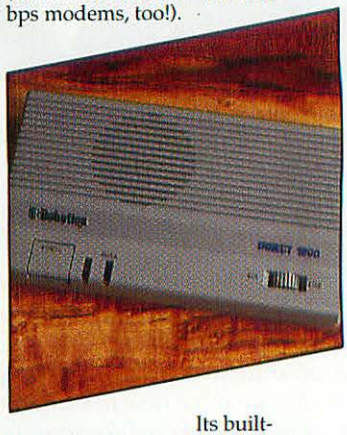
Direct 1200 Modem

From USRobotics

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A breakthrough in technology gives you remarkable 1200 bits-per-second (bps) speed at a remarkably low price. If you're still communicating at 300 bps, you'll be amazed at the difference speed makes: files that took you two hours to transfer can be sent in half an hour using the Direct 1200.

This sleek modem has auto-dial and auto-answer capability, and it's fully Hayes compatible, so it works with all the best telecom software (it can communicate with 300-bps modems, too!).



Its built-in speaker lets you hear your call go through, while transmit-data and receive-data indicators let you watch as your information is transferred — you always know what's going on. Volume and power are controlled conveniently from the front. Wait less, do more with a Direct 1200.

Requires Mac (Plus)-to-Modem Cable

Icon Review

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Requires Mac (Plus)-to-Modem Cable & compatible software

Ortho's Computerized Gardening

From Ortho

$33

This program teams with your Mac to help you select plants for your home and garden. Simply type in your zip code, select any combination of color(s), blooming patterns, size, or sunlight accessibility, and you get a listing of plants that meet your specifications. Includes a database of more than 750 plants and a 192-page, full-color book illustrating gardening techniques.

Works with any Mac; does not support LaserWriter

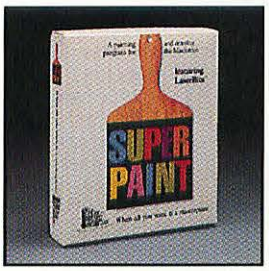


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Requires 512K, Mac Plus, or Mac XL



Neos Mouse

From Qualitas Trading Company

$49

This mouse represents a natural evolution in mouse technology. It's designed with a reverse-tapered shape that fits your hand without tiring your wrist. Teflon pads combine with a slightly higher cursor ratio for a free-moving, smooth feel that lets you get around the screen faster. Buttons actuate true micro-switches (not stamped-metal springs) to give you the tactile feedback of a distinct "click." You'll work faster, more surely with the Neos Mouse.

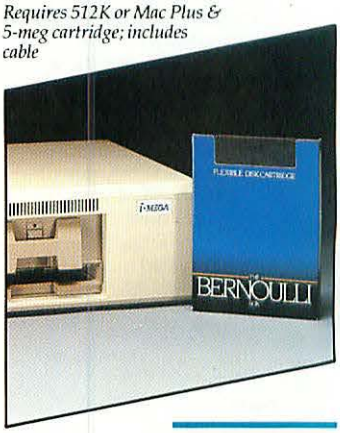
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Requires 512K or Mac Plus & 5-meg cartridge; includes cable



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KidsTime $29

Infinity
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Requires 512K or Mac Plus

Microsoft
Flight Simulator *SPECIAL* $32

Mindscape
Balance of Power $30
ComicWorks $49
Sophisticated graphics tool
Uninvited $32

Ortho Information Services
Ortho's Computerized Gardening *NEW* $33

Practical Computer Applications
MacGolf *SPECIAL* $36
Requires 512K or Mac Plus

Primera Software
Smash Hit Racquetball *NEW* $19

QED Information Systems
Typing Made Easy $35
Improve your typing skills

Rubicon
Dinner at Eight $32
Silver Palate Collection $29
Requires Dinner at Eight

Silicon Beach
Dark Castle $29
World Builder $45
Create your own games

Spectrum HoloByte
Orbiter $27

Communications

CompuServe
Subscription Kit $25
Visit Icon Review in the Electronic Mall

Data Viz
MacLink Plus w/cable $159
File transfer IBM to Mac

Farralon
PhoneNet for 128/512K $39
Connects Mac 128/512, LaserWriter, or AppleTalk devices
PhoneNet for Mac Plus $39
Connects Mac Plus or ImageWriter to Network
Phone Net/AppleTalk Adapter $6

Hayes
All Hayes products in stock; call for prices

Infosphere
MacServe (per server) $250
Hard disk partitioner, network disk server, print spooler & more!

PCPC
See Disk Drive section for new MacBottoms with built-in modems

Software Ventures
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Courier 9600 Modem *NEW* $769
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Direct 1200 Modem $119
Hayes compatible — Super value!

Hardware

Dove Computer Corp.
MacSnap 524 *NEW* $149
Expands 512K to 1 meg
MacSnap 524E *NEW* $149
Expands 512E to 1 meg
MacSnap 548E *NEW* $399
Expands 512E to 2 meg
MacSnap Plus 2 $269
Expands Mac Plus to 2 meg
MacSnap Plus 2H CMOS $669
Expands Mac Plus to 2 meg
MacSnap Plus 4H CMOS $1299
Expands Mac Plus to 4 meg
MacSnap SCSI Port $67
Internal upgrades; require installation by a qualified technician

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MacBuffer 512K $365
MacBuffer 1024K (1MB) $569
Save time while printing on ImageWriter
MacBuffer LW/1 meg $CALL
MacBuffer LW/2 meg $CALL
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Koala
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Nutmeg/Xerox FPD *NEW* $1949
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Summagraphics
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ThunderScan $189
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Improved adapter for Mac Plus
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Needed for use w/Mac Plus only

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AST 4000 *SPECIAL* $4849
74 Meg Winchester; 60 meg tape backup

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Iomega
Bernoulli Boxes for Mac Plus
NOTE NEW LOW PRICES!
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• 10+10 Dual SCSI Drive $1695
• 20 Meg SCSI Drive $1299
• 20+20 Dual SCSI Drive $1999
See Accessories for required cartridges
SPECIAL PURCHASE!
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Mirror Technologies
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MagNet 30x w/MacServe $995
Mirror 800K External Drive $CALL
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Mirror 40/40 $2695
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From Target Software

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Voila! is a full-featured desk accessory outliner that can be accessed from any program! Turn any document created with your word processor into an outline, then edit, expand, or print outlines easily. Voila! gives you complete sorting and search capabilities, control over fonts and type styles, resizable windows, and 256 headline levels. You can even generate a Table of Contents and paste in pictures from graphics programs. Make the most of your outlines with Voila!

Requires 512K or Mac Plus; compatible w/MacLightning 2.0, MORE & ThinkTank 512; supports ImageWriter & LaserWriter

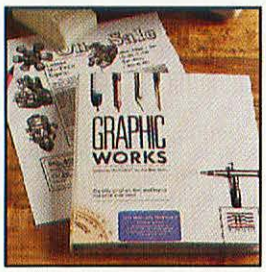
GraphicWorks 1.1

From Mindscape Inc.

$69

GraphicWorks combines the capabilities of bit-mapped programs like MacPaint with the object-oriented approach of programs like MacDraw. The result lets you integrate graphics and text anywhere on a page for easy page layout. Version 1.1 works with PageMaker, and it's the only paint program to support high-res scanners. Plus, it includes on-screen rulers, color printing, rotation, skew and distortion tools, and more!

Requires 512K or Mac Plus; not copy protected





PC MacKey

From Tangent

$119

The PC MacKey keyboard uses short-throw keys that have a distinctive action. As you type, your fingers feel a "click," which makes typing easier, faster, and less stressful over a long period. PC MacKey's layout matches that of the IBM PC; and, you get a numeric keypad and function keys that can be assigned macros by programs like Tempo. New version makes installation simple.

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Fanny Mac $79
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Make the right connection! We have a full line of quality cables; call for details

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MacInker — includes ink $44
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RollTop Cabinet-90 *NEW* $39
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Cards perch on Mac or keyboard providing quick reference. Choose from Excel, Jazz, MacWrite/MacPaint, MultiPlan, Word. Be sure to specify program name & card style when ordering.

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Better fit to hand, moves faster, smoother

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New MacBottom Drives

From PCPC

PCPC is expanding their award-winning line of hard disks to include SCSI drives with larger capacity and optional 1200 bps Hayes-compatible modems. Lightweight and highly portable, they include print spooling, backup, and locator software. Order one today for an elegant solution to your mass storage and telecommunication needs.

All require Mac Plus; SCSI cable included

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HD 40
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Includes built-in modem
$1429

Modem Upgrade Kit
Requires installation by qualified technician
$189

FactFinder

From MindWork Software

$49

FactFinder is a text-retrieval system that will store, organize, and cross-reference all your phone numbers, recipes, and miscellaneous notes. Enter information without defining fields or choosing formats. "FactSheets" you create can be retrieved later by name, by date created or last changed, or by keyword search. This program is an easy way to organize complex data — ideal for cross-referencing all kinds of information.

Works w/any Mac





MORE 1.1

From Living Videotext

$159

This new version of MORE not only automatically generates bullet or tree charts from outlines, it gives you selective text styling, new outlining tools, and easy-to-use, installable templates. Select menus and commands from your keyboard; use the built-in calendar to stamp the time and date in outlines, or to generate schedule outlines for a specified time period. Comes with a database listing more than 2,000 U.S. agencies and businesses.

Requires 512K or Mac Plus & 2nd drive

MindWrite

From MindWork Software

$89

MindWrite's superior integration of outlining and word processing tools focuses the power of your Mac on the most troublesome task in word processing: the writing. Drag text to new locations for fast reorganization and polishing, select and change an unlimited number of text segments simultaneously, and more. MindWrite's many innovative features save you time and help you write more effectively — whether dashing off a letter or laboring over detailed technical specs.

Requires 512K & 2nd drive, or (recommended) 512E or Mac Plus



Software

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Tempo — *SPECIAL* $59
Powerful macros with logic branching

ALP Systems
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Challenger Software
Mac3D — $129

Cognitive Concepts
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Preformatted business forms

Cortland
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Seven handy desk accessories

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Powerful object-oriented drawing program w/text-editing; requires 512E or Mac Plus
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MacForms — $42
Requires MacPaint

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Turbo Maccountant — *NEW* $264

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RAM Snap — $37
RAM disk software

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MacMatbook/Vols. 1-3 — $69
MacMatbook/Vols. 4-6 — $69
MacMatbook/Vols. 1-6 — $125
Indexed clip art; requires PictureBase

Enabling Technologies
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Execucom
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Business planning and decision analysis

Forethought
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FWB Software
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MindWork Software
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MindWrite — $89
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New Canaan
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- Personal Finance Template — $29

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Japanese Clip Art
- Scroll 1/Heaven — $79
- Scroll 2/Earth — $79

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Silicon Press — $42
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Super LaserSpool — $CA
SuperSpool — $CA

Survivor Software
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"Best New Personal Finance Program"

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I want Apple to be known for the excellence of its products. You don't have to be the largest to be the best.

family (the Mac 512K, the Mac Plus, the Mac SE, and the Mac II) that includes open and expandable products fulfills our hopes (and my dreams) for the Macintosh. We're early in the cycle, but I believe that the new machines—the Macintosh SE with its hard disk option and expansion slot and the Macintosh II with its open architecture, the 68020, color, large displays, and high performance—will succeed in the market.

These products, along with our Apple II family, make up a very wide offering.

When do you expect to ship the new machines?

I think that it's fair to say that the schedule will be similar to our experience with other machines. The Macintosh Plus was an enhancement of an existing product, and we began shipment shortly after the product announcement. The Macintosh SE will follow the Mac Plus example; we'll have some SE machines at introduction and will be able to ship in quantity shortly thereafter.

The Macintosh II represents a quantum leap in technology and design, and we will probably experience some of the difficulty with it that we saw with the IIGS. We announced the IIGS in September and needed about six months to ramp up to full production. All during that ramping period, the demand for the machine exceeded supply. The Macintosh II is new technology, and some of the parts are single-sourced from manufacturers. It takes time to develop the second-source suppliers needed for larger numbers of machines.

Is the Macintosh II a workstation or a personal computer?

First and foremost a personal computer. Perhaps the technology suggests that it is a workstation. We think that its power and its graphics base, and the speed of its 68020 microprocessor, will take it into sophisticated technology areas. There is currently a lot of advanced software being developed to take advantage of the Macintosh II.

Won't people be concerned because there is no hardware upgrade path from the Mac Plus to the Mac SE?

Remember that there will be compatibility and upgrade through software. But to upgrade the Plus to the SE requires so much—hard drive, more power, new analog board, new system board, expansion slot, changes to the plastic. By the time we're finished making all of those changes, the only part of the Macintosh that hasn't changed is the display. It's actually cheaper to sell you a completely new computer. However, we'll continue to sell the Macintosh Plus. A Plus and a hard drive are actually very close to what we have incorporated into the Macintosh SE. We felt that application compatibility for an entire product line was the most important goal.

What about the big picture? How does Apple rank compared to other computer companies in sales?

Apple is now number two in sales of personal computers worldwide. But it may be more useful to note that we are one of the few significant computer companies dedicated solely to manufacturing personal computers.

Would you like Apple to be number one?

I want Apple to be known for the excellence of its products, for its advanced technology, for its user-friendliness, and for providing solutions not possible with other personal computers. You don't have to be the largest to be the best.

Apple sales are now at about $2 billion annually. How will the company grow to $5 billion?

(continues)



The Power of Color.
Until now desktop publishers could only dream of it.

Great minds create powerful ideas in color: Their thoughts may be blue sky, wave a red flag or make the competition green with envy. But, somehow the reports and graphics that spring from these color ideas rarely convey the life and energy of the original thoughts.

Kroy® brings the power of color to desktop publishing and business communications with a simple process compatible with virtually every laser printer, including the Apple™ LaserWriter, and most photocopiers that apply dry toner to the page.



Presentation graphics like these are created on a laser printer, then enhanced for visual impact with KroyKolor (which applies color to the dull toner image produced by laser printers and copiers).

To bring your idea to life, add KroyKolor™ to the message. There are 60 vivid colors and shimmering metallic foils to match the mood and add impact to your business communications.

The matte and gloss colors range from a cool blue, to a blazing, fire-engine red.

Especially exciting are the 14 metallic foils that perfectly simulate foil stamping on your logos, invitations, letterhead, presentation folders, newsletter, artwork and mockups. The dazzling metallics range from polished gold and silver to burnished aluminum and copper.



Signs and display graphics of all types can be created on a printer or copier, enhanced with KroyKolor, then laminated with clear plastic or mounted into a Kroy sign frame.

Applying KroyKolor is an easy (and amazing) process.

After your original has been printed on a laser printer or photocopier, you insert it into a sheet of KroyKolor transfer film, feed it through the processor, peel away the transfer film and you have vibrant color in seconds.

The real fun begins when you create multi-color business graphics (such as a pie chart with each slice a different color). To do this, cut pieces from various colors of transfer film and place the pieces onto the areas of the graphic you wish to highlight. That's how the multi-colored examples shown in this ad were produced. It's possible to produce multi-colored presentation graphics in a few minutes which would have taken several days (and several hundred dollars) to produce at a print shop.

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The KroyKolor processor accepts materials up to 12" wide. KroyKolor transfer films are slightly larger than an 8½x11" page, providing edge-to-edge coverage.

KroyKolor™

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"Our goal was simple capable writing too mind saying, we've

Charles Simonyi, Chief Architect, Applications, Microsoft Corporation.

We weren't looking for incremental improvements. We were shooting for a quantum leap. Not a word processor but a *document* processor. A tool which would exceed every expectation and overwhelm every standard.

From now on, when people define what software should do for the production of documents, they'll point to this: Microsoft® Word Version 3.0 for the Apple® Macintosh.™

On Word, everything you need to structure a document is integrated into the program. Starting up front with the outliner. Followed by style sheets which you can quickly set up to standardize and recall the formats you use repeatedly. Then a built-in spelling checker proofreads for you when you're finished.

Because speed is of the essence, we made Word a rocket. It scrolls faster, saves faster. And you can't out-type it.

Because there's a big, diverse world out there, Word easily shares and automatically converts files created with the IBM® PC version of Word. And supports DCA protocols for exchanging formatted files with minis, mainframes, and dedicated word processors.

Finally, what you see on screen will look superb on paper. Word will set text next to graphics. And exploit the capabilities of laser printers beyond anything that has gone before.

But the most powerful feature of all is its accessibility. Word lets you run its menus in either Short or Full mode. The first, a concise, basic menu which gets new users producing instantly. The second, a comprehensive menu which taps into Word's vast capacities.

That's Word for the Macintosh. Not just the best word processor on any microcomputer, but the most effective tool of persuasion ever devised.

Microsoft Word is available for the IBM PC and compatibles and the Apple Macintosh.

For the name of the nearest Microsoft dealer or to upgrade to Version 3.0, call (800) 426-9400.
In Washington State and Alaska, (206) 882-8088. In Canada, call (416) 673-7638.

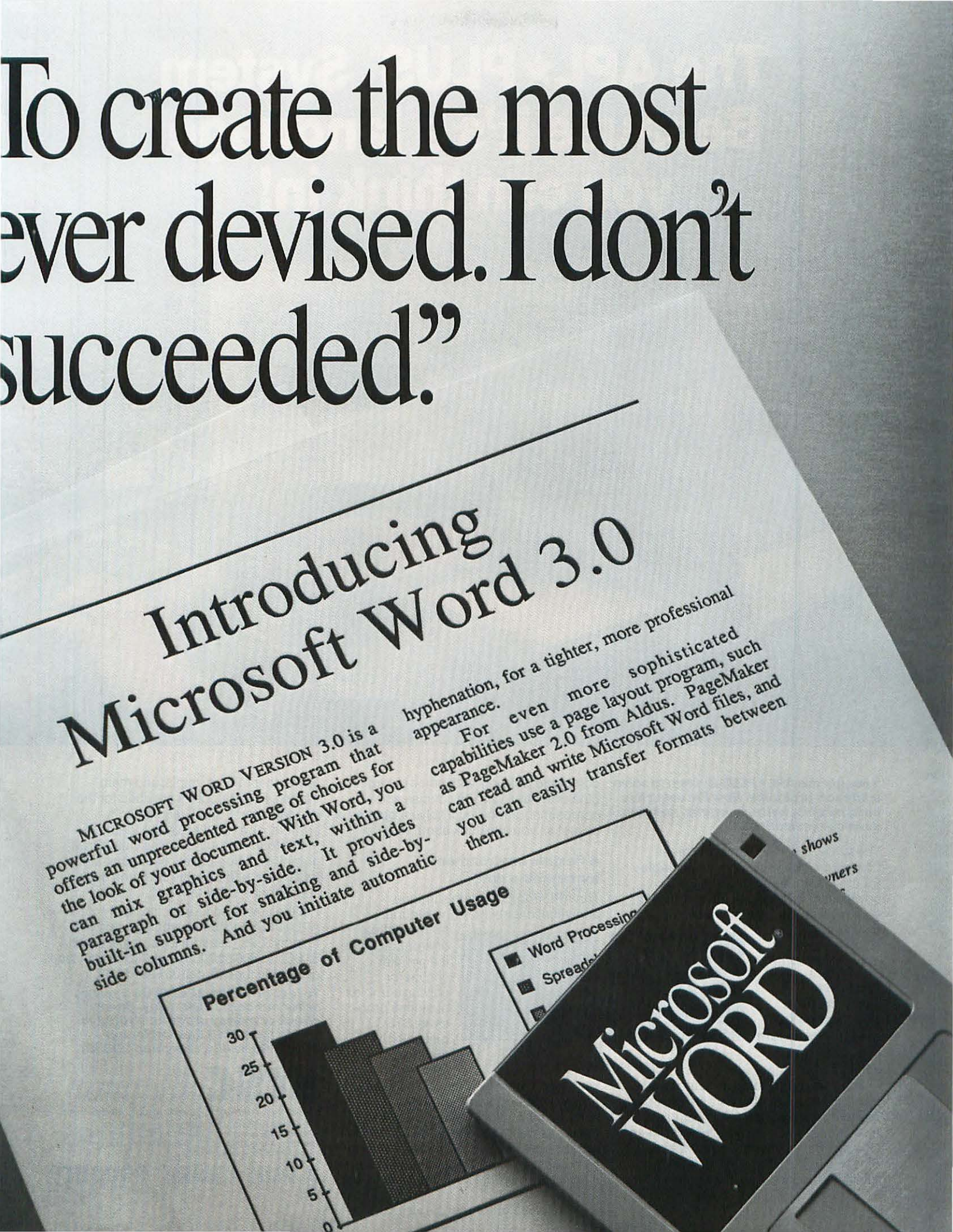
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To create the most ever devised. I don't succeeded."

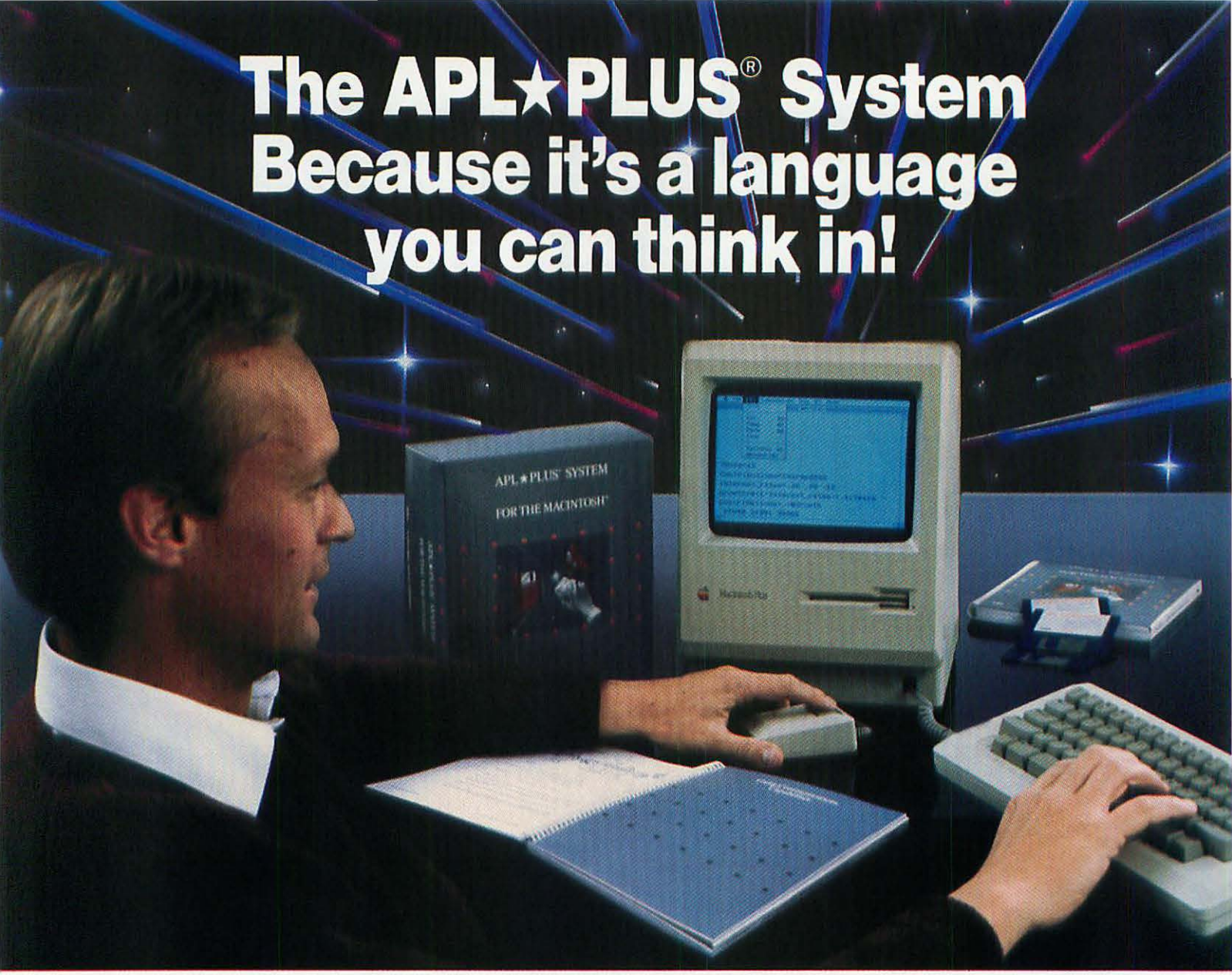
Introducing Microsoft Word 3.0

MICROSOFT WORD VERSION 3.0 is a powerful word processing program that offers an unprecedented range of choices for the look of your document. With Word, you can mix graphics and text, within a paragraph or side-by-side. It provides built-in support for snaking and side-by-side columns. And you initiate automatic hyphenation, for a tighter, more professional appearance.

For even more sophisticated capabilities use a page layout program, such as PageMaker 2.0 from Aldus. PageMaker can read and write Microsoft Word files, and you can easily transfer formats between them.



The APL★PLUS® System Because it's a language you can think in!

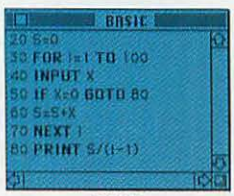


"I bought the APL★PLUS System to solve analytical problems. Now I'm using it to build models, write programs, and even develop applications!"

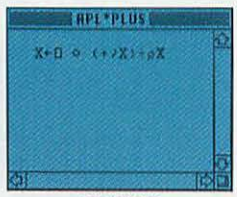
The APL★PLUS System is the most flexible problem solving tool available for the Macintosh™. It combines a powerful APL language interpreter with your favorite Macintosh features to step up your problem solving and programming power.

Increase productivity with powerful concise notation

Concentrate on what you're doing —not how you're doing it. At the heart of the APL★PLUS System is a set of easy to use symbols that condense complex operations into a few simple keystrokes. One symbol can sort an array, invert a matrix, search for a string, or add up a table of numbers. And, the same command will work with small or large blocks of data. With its concise and compact notation, you'll solve problems as fast as you can think about them.



BASIC



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A program to calculate averages

A flexible environment for handling data

The APL★PLUS System's unique analytical capabilities and natural mathematical orientation make it a popular choice for solving complex business problems. STSC builds in the quality extras that make APL work best with your Macintosh. Included are over 100 additional language enhancements for greater power and speed, and a library of tutorial and utility workspaces. Built-in terminal emulation with upload/download capabilities make it easy to move data and programs to and from other micros, minis, and mainframes. Full support is provided for the ImageWriter™ and LaserWriter™ printers, and you'll enjoy standard Macintosh features such as QuickDraw graphics, dialog boxes, cut-and-paste full-screen editing, plus common desk accessories, all within APL.

Put the power, speed, and flexibility of the APL★PLUS System to work for you today for only $395! See your local dealer or call STSC at **1-800-592-0050**, ext. 700 (in Maryland or outside the U.S. call **301-984-5123**).

To test-drive the APL★PLUS System, order our demo disk today. Send a check or money order for $10.00 to STSC, Inc., 2115 East Jefferson Street, Rockville, Maryland 20852.

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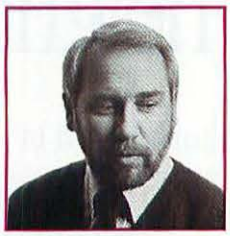
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Circle 635 on reader service card



A Plus and a hard drive are actually very close to what we have incorporated into the Macintosh SE.

We are currently mapping our future strategies. We start with our corporate identity and goals. We don't put a dollar figure up on a board and strategize about how to reach it. We begin by asking how to reach our goals, and then add the financial considerations.

What specific goals do you have in the near future for Apple?

We look at goals in several important areas. I'll give you an example: networking and communications. In this area we have four specific goals. First, to enhance the AppleTalk communications protocols so that they extend across our entire product line and provide easy communications with other manufacturers' computers. Second, we want to have a line of network servers, the first of which we announced in January. Third, to enhance our communications with Digital Equipment Corporation machines—it is easier for us to get our hands around the VMS operating system environment (than the IBM environment) and to add communications solutions because the protocols are all public. And fourth, we want to communicate with IBM machines. We are tracking developments with the Token-Ring, but what a job! There are so many product offerings in this arena.

Our other direction for IBM connectivity is to provide 3270 emulation. We already have one product on the market—AppleLine—that provides 3278 terminal emulation.

What role do you see Apple playing as a global company?

Last year we began to be a global company in a very real sense. Mike Spindler [senior vice president for international operations] was reassigned here to Cupertino to ensure that our international marketing has a focus at the corporate headquarters. Mike is involved, possessed even, with making sure we keep the world market in mind.

What we have to do to ensure our success internationally is to recognize that we have eight very distinct markets abroad: the UK, France, Germany, Italy, GEA [Greater European Area], Japan, Australia, and Canada. And each of these markets has to be handled individually. For example, the Kanji Macintosh. We beat our heads against the wall in Japan for years until we finally understood what it takes to be successful there. Once we had Kanji in our product, people saw that we were serious about our machines. Since then we have exceeded all of our plans for Japan.

What role does the Macintosh play in international markets?

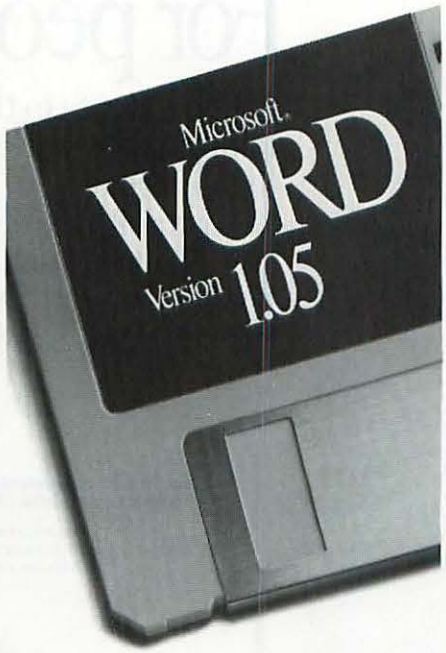
The international markets in general are Macintosh-oriented. Abroad it's primarily seen as a business tool, but it's also doing very well in university markets around the world, through the various Apple university consortium programs. The Macintosh Plus is also one of the most market-adapted personal computers in the world, since it is currently delivered in 21 versions (including Arabic and the aforementioned Kanji).

Recently it was reported that Apple's Swedish subsidiary sold some Macs to the Soviet Union. How did you arrange the sale, given the U.S. government's restrictions on the sale of computers with more than 16-bit technology? Does this signal a new beachhead for Apple's marketing?

Apple applied for and received authorization from the U.S. Department of Commerce to ship five Macintosh Plus systems from our office in Sweden to a company in Moscow. These units are being used for evaluation. To make additional shipments we would need another authorization.

It has become apparent that the Soviet

(continues)



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A financial analysis tool of unprecedented power, Microsoft Excel is first of all the most formidable spreadsheet ever to run on a personal computer.

A spreadsheet which is in turn linked in harmony with an extraordinary graphics program and a highly capable data filing application.

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A totally new type of software that simulates the act of painting or writing on absorbent rice paper. Watch your creation "flow" onto the workscreen, choosing from **6 brush sizes, 5 brush touches,** and **5 shades of black to gray "ink."** But MacCalligraphy offers even more intriguing features, like a **custom touch editor** that creates effects never before possible with a real brush. No other program for Macintosh® is quite like it. MacCalligraphy is the creation of Enzan Hoshigumi of Tokyo, producer of **Japanese Clip Art** in 2 volumes, highly rated by *Macworld* in the December 1986 issue.

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We have made the Macintosh proprietary technology from day one, and we want to keep it that way.

Union's utilization of microcomputers has not really gotten off the ground.

Apple is sometimes criticized as being focused on Silicon Valley and not the rest of the United States.

Perhaps that has been true in the past, but in the last year or two we've become more involved with the rest of the country. For example, I was recently contacted by the Congressional Office of Technology Assessment to act as a member of a task force on how computers can or should affect education. Although I have a responsibility as the COO to act on behalf of Apple, I believe I was selected to serve because I also have a personal interest in education, especially in the K through 12 arena. I am also interested in supporting other educational tools, such as CD ROM, VCR, and other technologies.

I recently met with Secretary of Commerce Malcolm Baldridge, who asked me for input on decisions being made in Washington, such as my reaction to the Japan-U.S. semiconductor pact. I went armed with a lot of information on Apple's position as a purchaser of semiconductors. He asked me, "Where have you been?" This perspective from chip users in Silicon Valley had not been offered publicly in Washington before the signing of the pact. To remedy our lack of presence in Washington, we opened a public affairs office there this year. We need to have a voice on matters vital to the computer business. This is one of the ways that we add value to the country in which we live.

Apple's key identity is that we create great personal computer products. Why? Because we have a passion to change the world. Our products can actually do that.

How can Apple combat foreign legislation supporting indigenous manufacturers?

You have to do this from the standpoint of technology. From the standpoint of our system, we win. We are excited about our machines and we have supporters that feel the same way. In a government-controlled environment, we do what is required to be successful. We invest in foreign countries to show that we are not only there as a U.S. computer company, but also to add value to the country in question.

Will Apple continue to manufacture its own peripherals, or will that change now that the open machine is here?

Peripherals are very important to us. They are a large part of our revenue base, and Apple will continue to have a role to play in peripherals. But we do not want to chill third-party development. It is in our strategic interest to encourage third parties to make products for our computers that will open up new markets, products that will extend the computer far beyond even what we have envisioned.

At one level, the competition between IBM and Apple reduces to a battle between the microprocessors. What distinctions do you see between Motorola- and Intel-based machines?

We chose the Motorola architecture because it is more robust than the architecture of the Intel family. As a result, applications will be able to migrate easily from one processor to another. Considering that the power of the 80386 and 68020 are equal, the distinctions that the Motorola chip offers in family compatibility and graphics flexibility make it the best choice for our systems.

With our 68000 line we can build in rules that take advantage of the strengths of the Macintosh—particularly for graphics. Specific advantages include features such as the general-purpose registers of the 68000 family. General-purpose registers offer the programmer more flexibility for graphics than the dedicated registers of the Intel architecture. We believe the result is better software.

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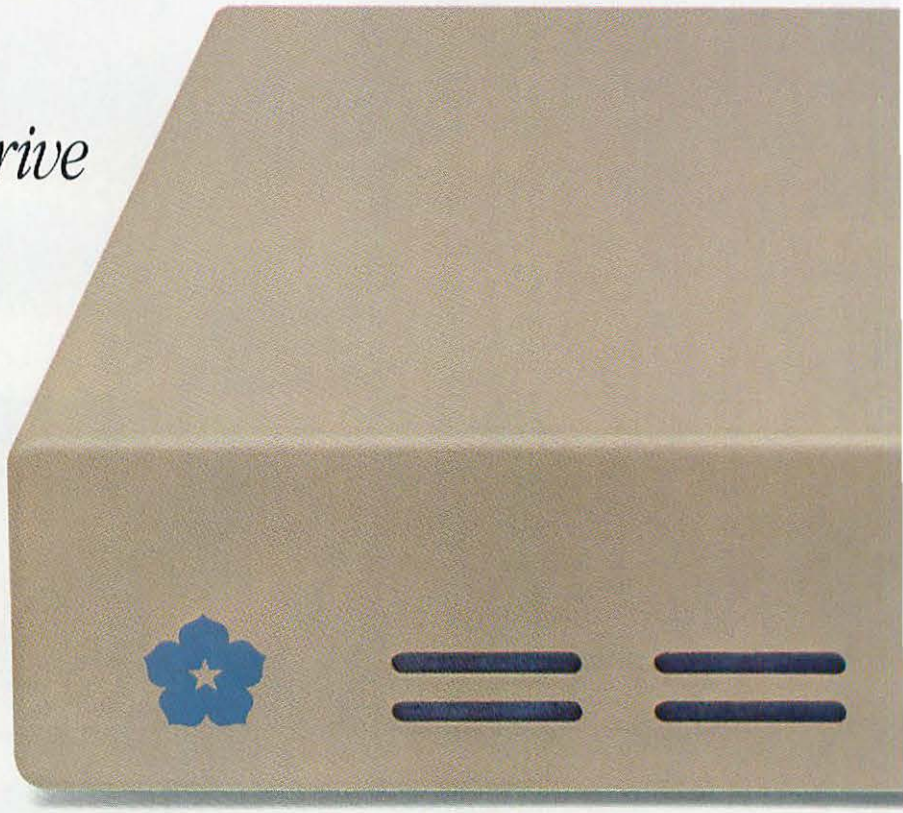
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Jasmine has the drive

80 MB Direct Drive
*$1380.00**

The Direct Drive 80™

A true performance breakthrough! This sleek drive designed by Quantum blazes away with an amazing 26 millisecond access time. It features error correction and media defect handling to ensure long life and perfect performance. This drive is so intelligent it constantly scans and locates any defective sectors and locks them out... automatically. We're so confident about the superiority of this drive that we offer a full 2-year warranty for only $100 additional. It fits into the same slim case as the others in the Direct Drive series.



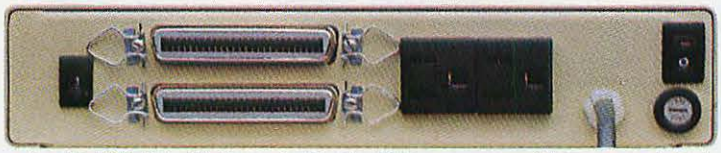
This sleek, attractive case is only about 2" high and does not stick out behind the Mac.

Bail mounts to secure your cables to the Direct Drive.

2 SCSI connectors for daisy chaining.

2 switched AC outlets so you can surge protect your Mac and printer or modem.

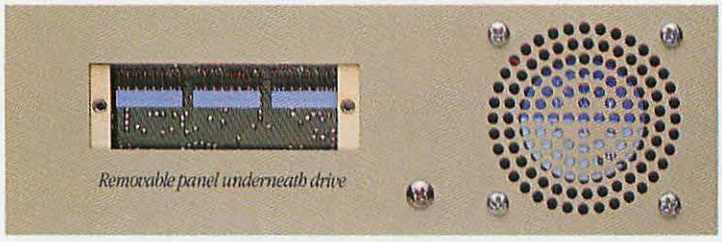
Precision German made switches.



Our original SCSI select switch allows you to add another drive or tape backup with one push of a button. No longer do you have to open up a box to assign the SCSI port number.

3 Prong Power Cord.

External Fuse.



To add three or more SCSI devices, some small plugs called terminating resistors must be removed from the middle units. Jasmine designed this small panel so you never need to play technician and open our box.

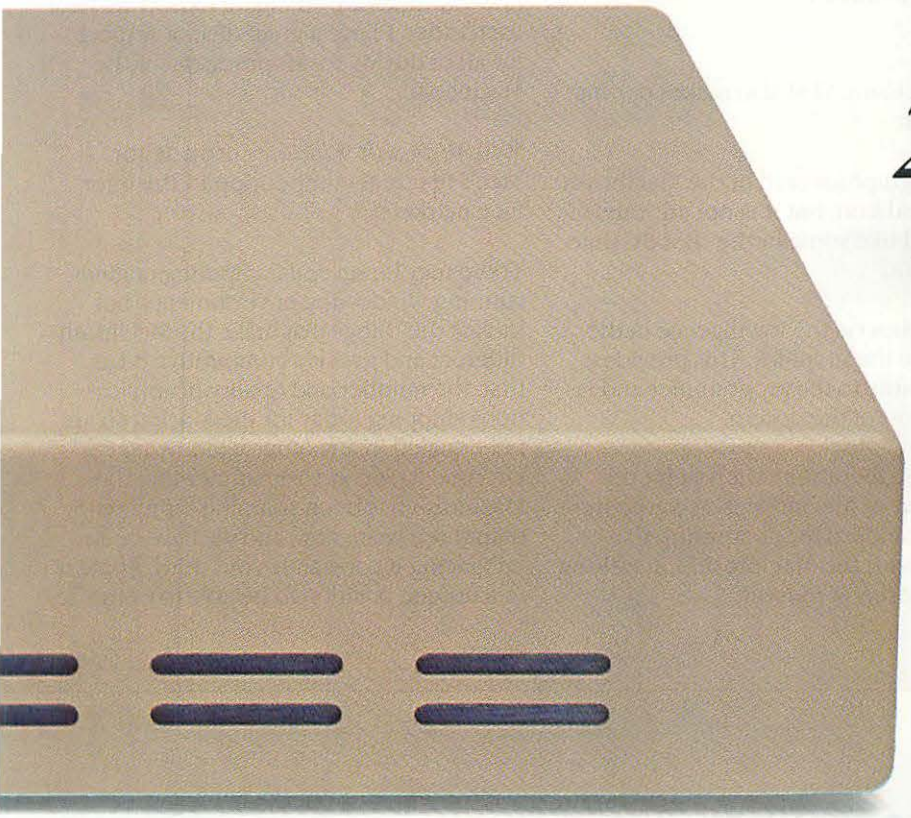
Our ultra quiet fan pulls air through the drive and sends it out the bottom.

Exclusively Jasmine

- adds shock absorbers that protect your drive.
- adds two switched AC outlets at no extra charge.
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- features the original SCSI select switch that allows you to add another drive or tape backup with the push of a button.
- never requires you to open the box to daisy chain multiple drives.
- tests each drive with sophisticated real time diagnostics before shipping.
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- 2' cable included with your purchase. Add $8.50 for 6' cable.

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Our first product met with resounding success and we're still proud to put our name on it. The Direct Drive series satisfies your hunger for power and we know they fit your pocket book. Compare these drives to so called "high performance" drives costing twice as much. So, if you're a power user, dial direct and we'll get you running fast.

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Air Freight $20.00. CA residents add 6.5% Sales Tax. C.O.D. orders add 5% + shipping. Same day rush shipments available at extra charge.

No SCSI Port? Try JasPort™ Jasmine's $129 solution

When Apple added the Small Computer Systems Interface (SCSI) port to the Macintosh™ Plus, it allowed users access to high performance hard disks. Now the Macintosh 512 Enhanced can be SCSI upgraded with Jasmine's SCSI Port Adapter. You can purchase the JasPort Adapter, with any Direct Drive purchase, for only $129. No internal modifications, no soldering. In minutes your Macintosh 512 E runs data at the speed of the Macintosh Plus!

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The Jasmine technical support line answers all your questions about using your drive – no matter how simple or technical. Every drive is shipped with a technical hotline number to answer your questions.

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The Direct Drive series is so easy to service that in the event of a malfunction, we can promise a maximum 48 hour turnaround on any drive that needs repair. We will recover any data, if possible, in the event you have forgotten to back up your files.

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I've always felt that the Macintosh should be open and expandable. We forgot our roots when we delivered a closed Mac.

Our ROM [for system software] also has room to grow. We have made the Macintosh proprietary technology from day one, and we want to keep it that way. I don't want this company to spawn clones.

For the first time, in the new machines Apple has made wide use of new semiconductor technology—semicustom silicon devices. Why?

The technology has allowed us to keep the machines small and reduce our footprint. The use of surface-mounting devices has also reduced our board sizes, and VSLI [very large scale integration] has contributed to a reduction in our number of components. That means lower manufacturing cost and more reliability. Finally, VLSI has benefits such as protecting our proprietary technology. Using VLSI also makes our machines faster.

The video/graphics card of the Macintosh II has new silicon, but it is not an "intelligent" card like some in the IBM PC market. Why not?

Our card relies on the intelligence in the CPU to drive the graphics. This provides more flexibility to the programmer and reduces the cost of the system.

What do you feel about Microsoft (the largest seller of Macintosh software) supporting a standard for computing that competes with the Macintosh? I'm talking about *Microsoft Windows*.

It concerns me a great deal that products they develop may impact the Macintosh. Our relationship has to date been a partnership, and we continue to look forward to this kind of relation. But *Windows* has begun to look competitive. Bill Gates and I have begun to talk about everything from how our roles are changing to how we treat each other. I have a great deal of respect for all of the Microsoft products for the Macintosh.

Will *Microsoft Windows* provide the Mac's first real competition in the interface market?

There may be several computing engines running windowing environments, but look at the things that make the Macintosh different and give it a competitive edge: first, the number and quality of applications shipping today for the Macintosh are not equaled in any other windowing environment. Second, remember that the Macintosh has been shipping for more than three years now, and we have been enhancing it constantly. And third, Apple is in a unique position to be able to optimize

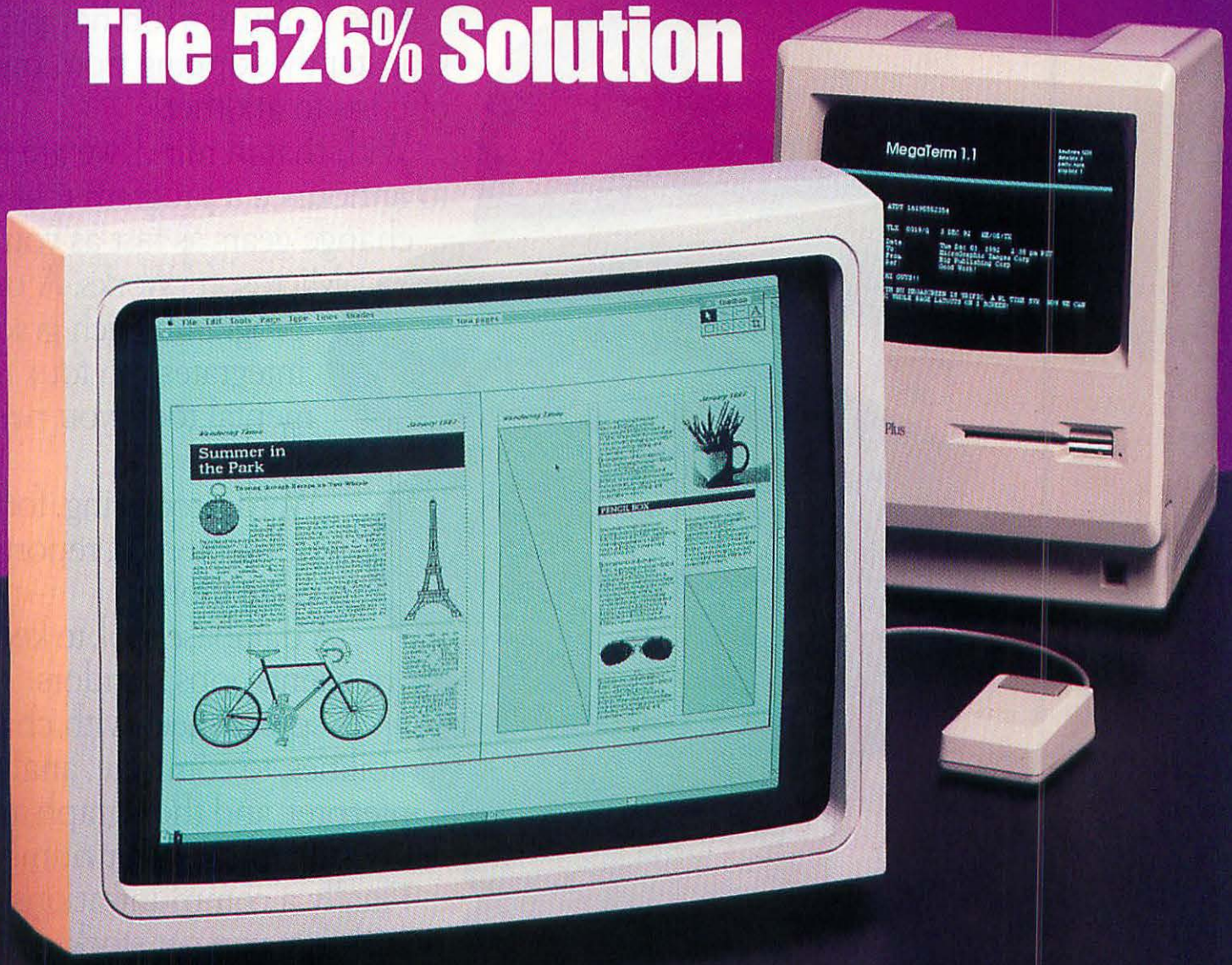
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The 526% Solution



MegaScreen II's 19.5" monitor gives you a 526% bigger picture than your Macintosh™ computer, at a new lower price! And MegaScreen II is bigger, brighter, and features the highest resolution of any big screen on the market today.

Compatible with all standard Macintosh software, MegaScreen II lets you see double page spreads, spreadsheets, drawings, plans, scans, CAD layouts, circuits, diagrams, medical files, and just about everything you ever wanted to see larger. 526% larger.

MegaScreen II can be dealer-installed in just 15 minutes, features extra enhancements, user updates, and rock-solid reliability backed by the people who pioneered the first peripherals for the Macintosh.

Find out how you can double your productivity. Ask your local Apple Dealer for a demonstration, or give us a call.

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We'll make it easy



Face it. You're a job hopper. Constantly skipping from one kind of crisis to another.

With that in mind, we are pleased to announce a program that can change gears as fast as you do: Microsoft® Works. A one disk program which gracefully integrates the four fundamental tools you need at work:

Word processing, for writing memos, reports, presentations.

A database tool, to keep track of clients, jobs, vendors.

A spreadsheet with charting abilities, to compute, analyze, interpret, and then graph anything to do with finance or numbers.

Finally a communications tool which lets you get stock quotes, make travel reservations, do research, and send reports across the country, right over the phone line.

'or you to change jobs.

Microsoft Works lets you juggle all hese jobs, move swiftly and easily ›etween them, while transferring nd combining their information as ou please. Because you do all hese jobs with one, easy to learn, ›tally integrated program.

Quick study. Quick change.

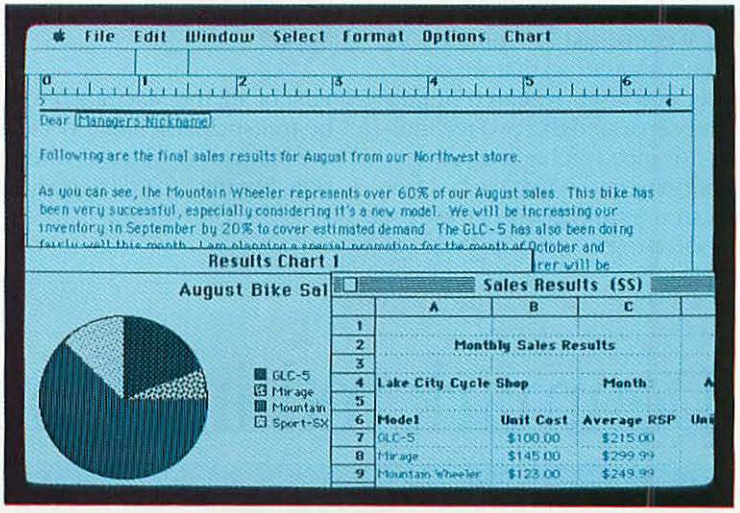
The first job is the easiest. Learning to use Microsoft Works.

It's a snap. The overall program nd each tool within runs Macntosh™ style. Which, as you probably know, is a natural, common sense, point-at-what-you-want system.

And Microsoft Works is seamessly melded together. You can have ll four tools on screen at once. Jump nstantly from one to another. And ater combine work done in each art of the program on a single rinted page.

This easy exchange of data nakes jobs go faster and easier. One practical example being mass mailings of form letters where you need to combine names from the database with text written in the word processor.

All in all, Microsoft Works is a superb solution for day to day, get-it-done problems. An inspiring display of convenience, efficiency, and utility.



And, of course, it's a product of Microsoft, the preeminent developer of programs for the Macintosh. Which is not a claim, it's a fact.

If you're in a business that won't let you stick to one thing, check out Microsoft Works. The program that can change jobs as fast as you do.

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The High Performance Software

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Considering that the power of the 80386 and 68020 are equal, the distinctions the Motorola chip offers make it the best choice.

the combination of hardware, software, and peripherals, more than anyone else in the industry.

You have said many times that you want Apple to lead in technology. How can you accomplish that?

First of all by staying entrepreneurially driven. We have doubled the amount of money given to our research and development efforts for both system and software engineering. We invested $15 million for the Cray supercomputer so that we could support better and faster research simulations. We have separated the two technology groups—advanced technology and product development—so that each is free from the constraints and goals of the other. And we support projects such as Vivarium, which pushes both technology and our corporate goal to better the role of computing in education.

Maybe most importantly, we foster an environment in which people are allowed to make mistakes, to learn from them, and to go forward.

The Macintosh is often called a portable, but now we are beginning to see several developers making truly portable Macs. When should we expect a portable from Apple?

First of all, the Macintosh was designed to be transportable, not portable. I can take my Macintosh with me when I go on vacation, but it wasn't designed to allow me to use it on the airplane. However, some third parties have found innovative ways to rework Macintoshes in portable configurations. As far as an Apple product, all I can say is I would love to have one. It is reasonable to expect us to introduce new products and technologies for markets when we believe that both the markets and the technologies are ready.

We've talked a lot about Apple's future, but what's next for you personally?

This is next. I've achieved so much—you have all of these dreams during college: you think, "I want to be the head of a major corporation." Well, here I am in top management. I'll stay at Apple because I am able to learn and grow. And I have the potential to change the future. You can make the case that with technology one can influence the future. This is the first technology since books that can impact not only what we learn but how it is learned.

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Interviewed by Jerry Borrell

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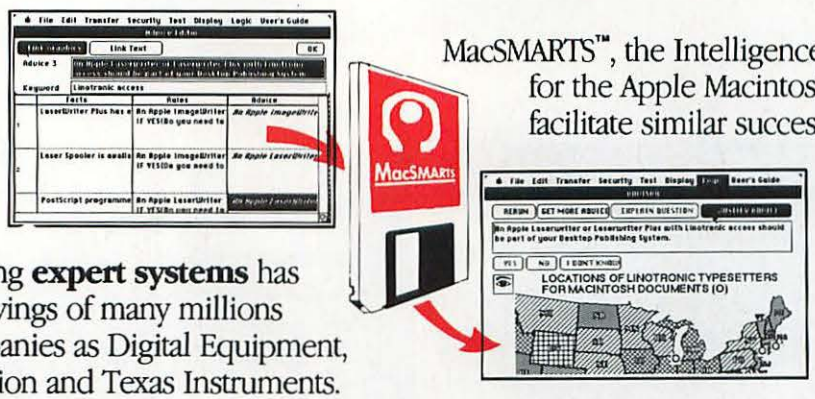
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Step-By-Step Tutorial And Examples Included

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Knowledge is a strategic resource of individuals and of corporations. Properly managed the impact can be tremendous. The substantial investment in developing **expert systems** has paid off in corporate savings of many millions of dollars to such companies as Digital Equipment, Westinghouse Corporation and Texas Instruments.



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By making it easy to construct a knowledge base—consisting of facts, rules and examples—in the Logic Worksheet you can use deductive and inductive inferencing techniques to diagnose and advise, design, plan or trouble-shoot.

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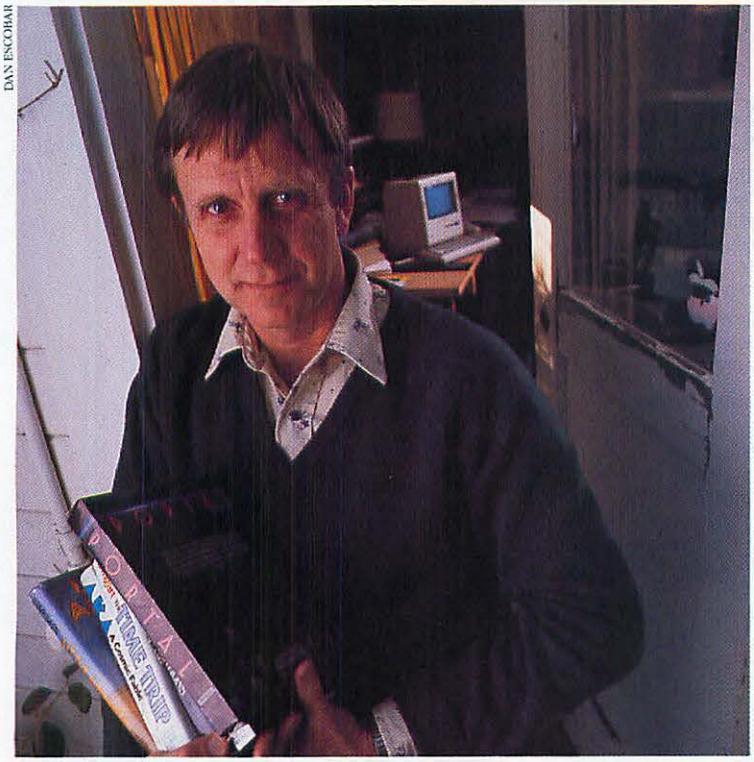
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Macworld News

by Daniel Farber

DAN ESCOBAR



Rob Swigart, author of several novels, and most recently of an electronic novel,* Portal, *believes that text adventures are moving toward more interaction between artist and audience.

Computer Literacy

Turning books into movies and vice versa is a common practice. Who could ever forget *The Maltese Falcon*—great book, great movie—or *Valley of the Dolls*—terrible book, terrible movie. Now, literature and movies—including Bradbury's *Fahrenheit 451* (Telarium), Douglas Adams' *The Hitchhiker's Guide to the Galaxy* (Infocom), *Rambo* (Mindscape), and *Goldfinger* (Mindscape)—have been transformed into electronic editions, or *text adventures.* However, the computer affords these narratives an added dimension—you become the central character in the story. While this interactive quality might foster role-playing fantasies, it also destroys most of the literary aspects of the original.

"The linear narrative of a book doesn't suit a computer," says Roger Buoy, president of Mindscape, which publishes several text adventures. "Basically, you have to turn a flat surface into a cube. A story must be able to branch in different directions."

Adapting books for the electronic medium or even the film medium requires a lot of judicious cutting. According to Ann Watson of AngelSoft, developer of Mindscape's book and movie conversions, the challenge is to let players become characters in 20 pages of text, rather than 120 pages, and keep the story moving. You drop the descriptive literary nuances and the introspective side of characters in exchange for a higher degree of player involvement.

Rob Swigart, author of *Portal,* an electronic novel published by Activision specifically for computers), views text adventures primarily as games—low on content but high on social interaction, matching wits with other players or the computer. Swigart feels that text adventures are moving toward art—high in content but low in social interaction, characterized by solitary communion between the artist and the audience—but they still have a long way to go.

Mindscape's Buoy believes the trend is moving away from strict text adventures toward graphics-and-text combinations. But even with these, innovations will hinge on the availability of CD ROM, better graphics and sound, and improved animation, all geared for the computer medium.

Graphics News Services Expanding

The *Chicago Tribune* has announced a new daily informational graphics news service to be created, electronically distributed, and received on Macintosh systems.

TribNet will compete with the recently begun Knight-Ridder Graphics News Service for supplying the many large and medium-size newspapers with the information graphics that accompany news stories. Previously these graphics were transmitted by low-resolution facsimile over wire-service photo networks or mailed as hard copy. Instant electronic

MICHAEL ABRAMSON



The* Chicago Tribune *aims to distribute Mac graphics worldwide.

(continues)

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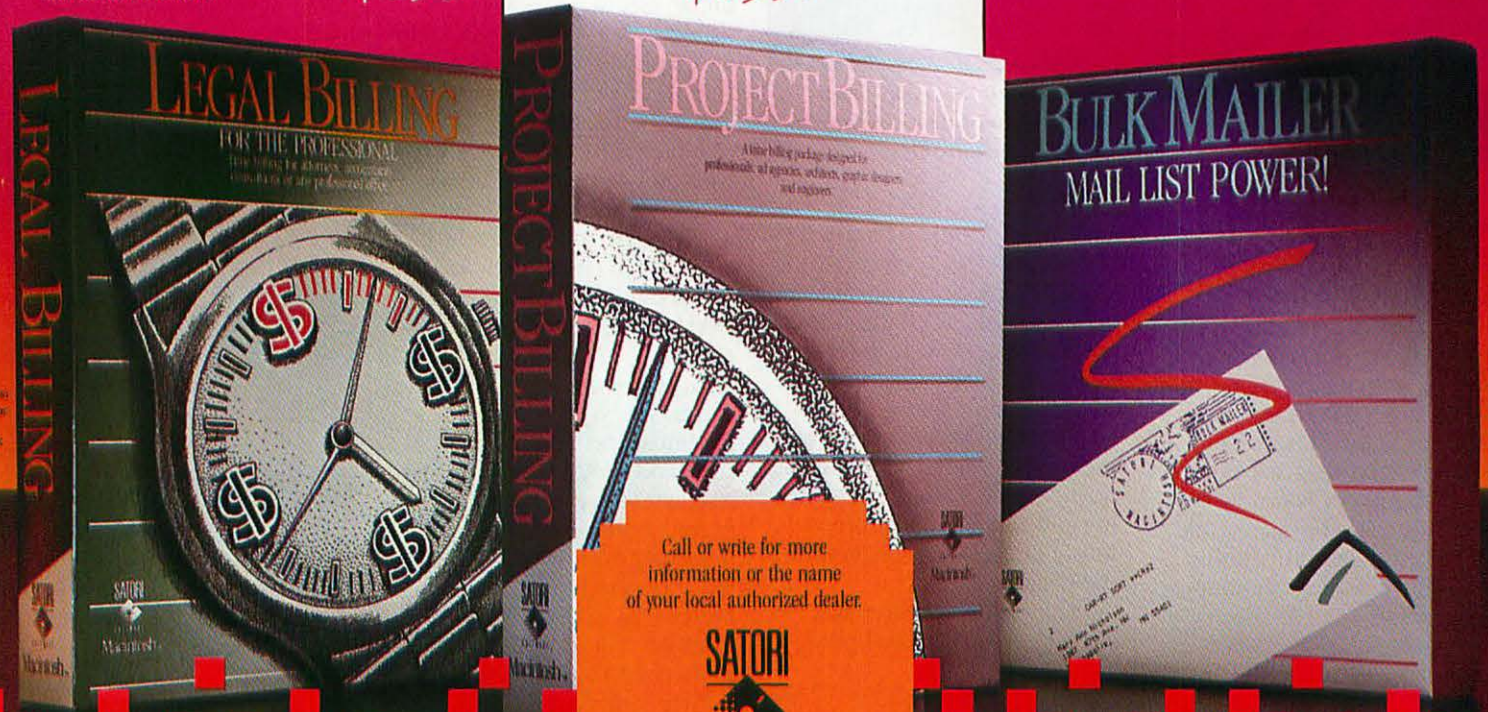
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Graphic News Services Expanding (continued)

transmission guarantees higher resolution and allows newspapers to customize images on their own Macintosh equipment.

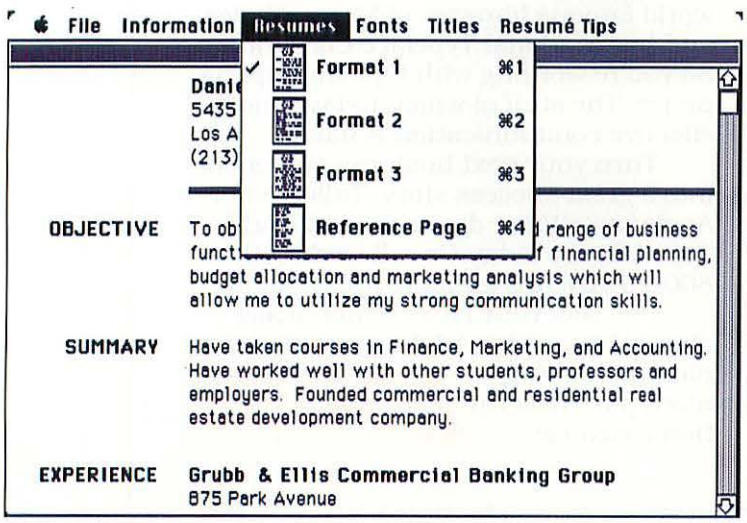
Since neither AP nor UPI distributes Mac-compatible graphics, other news organizations are acting to fill the demand created in newspaper art departments by the Mac's versatile and relatively low-cost workstations.

The *Chicago Tribune*'s *Trib-Net* will be transmitted over a telecommunications network developed by General Electric Information Service and Apple Computer, similar to Knight-Ridder's *PressLink*. The Tribune Media Service will market both competing Mac-based graphics services.—*Stuart Silverstone*

RésuméWriter

Bootware Software's *Personal Résumé-Writer* takes the drudgery out of producing and updating résumés. You simply type information into special windows, and the program formats the document to your specs. You can vary the contents without having to delete any information from the database.

While *Personal Résumé-Writer* only handles résumés for a single name and only costs about $30, *Production RésuméWriter* allows unlimited names to be used and is available for $595. The developer also publishes a book that includes over 100 sample résumés and instructions for creating templates. For more information contact Bootware Software Company, Inc., 5856 Parkmor Rd., Calabasas, CA 91302, 818/880-4877. *Personal RésuméWriter* is also available through the Academic Courseware Exchange.



If you're in the job market,* Personal RésuméWriter *allows you to customize résumés easily and quickly.

Coloring Mac

At Color Systems Technology in Marina del Rey, California, 100 Macs are part of a system used to apply color to such classic black-and-white films as *Miracle on 34th Street, Yankee Doodle Dandy,* and *The Maltese Falcon.* At Color Systems, vintage films are transferred to videotape and divided into separate scenes. Technicians assign colors to areas of each scene, and the colors are added by computers. While it may seem



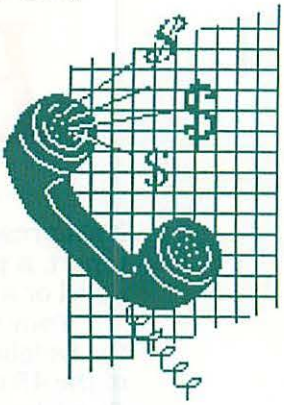
The Mac is giving an assist in coloring black-and-white films.

an ironic task for a computer with a black-and-white display, the Mac is used in two phases of the colorization process. The Mac's graphic user interface makes it an ideal front end for an Intel 186 processor, which in turn controls other devices. Instead of entering a command to fast-forward a tape machine, for example, an operator can click a fast-forward button on the Mac screen. The Macs are also used to define areas that will be assigned colors. Polygons depicting shapes in a scene are drawn on the Mac's screen and fed to a mixer via a camera set up in front of the Mac.

Colorization of another classic, *Casablanca,* is in the works. So when Bogey grimaces at you in living color, you can either thank the Mac or curse it, depending on your view of the controversial art of movie colorization.—*Erfert Nielson*

Money for Nothing?

If a good way to gauge a personal computer's acceptance as a business system is by the number of investment management products for that computer, the Mac is well on its way toward mainstream business use. For portfolio management and investment tracking, the following products are available: The *Isgur Portfolio System* (Batteries Included, 30 Mural St., Richmond Hill, Ontario, Canada L4B 1B5, 416/881-9941); *The Investor* (P3 Inc., 949 Parklane Center, Wichita, KS 67218, 316/686-2000); and *Dow Jones Market Manager Plus* (Dow Jones & Co., P.O. Box 300, Princeton, NJ 08540, 800/257-5114).



Each of these three programs lets you download stock prices from a variety of on-line information services, calculate portfolio profits and losses, and perform other housekeeping tasks.

If you do stock-market historical trend analysis (technical analysis), check out *Profit Stalker II* (Button Down Software, P.O. Box 19493, San Di-

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Money for Nothing (continued)

ego, CA 92119, 619/463-7474), one of the first Mac investment programs. It allows you to download stock and commodity prices from CompuServe and Merlin, and then view a wide variety of trend graphs and plots.

For analyzing specific financial information about a company (called fundamental analysis), *Value/Screen Plus* (Value Line Software, 711 Third Ave., New York, NY 10017, 800/654-0508) lets you screen the 1600 most actively traded stocks for certain conditions, based on up to 37 market variables updated every month or quarter, depending on your subscription terms. You can export various stock information to both *Excel* and *Jazz* for further analysis and tracking.

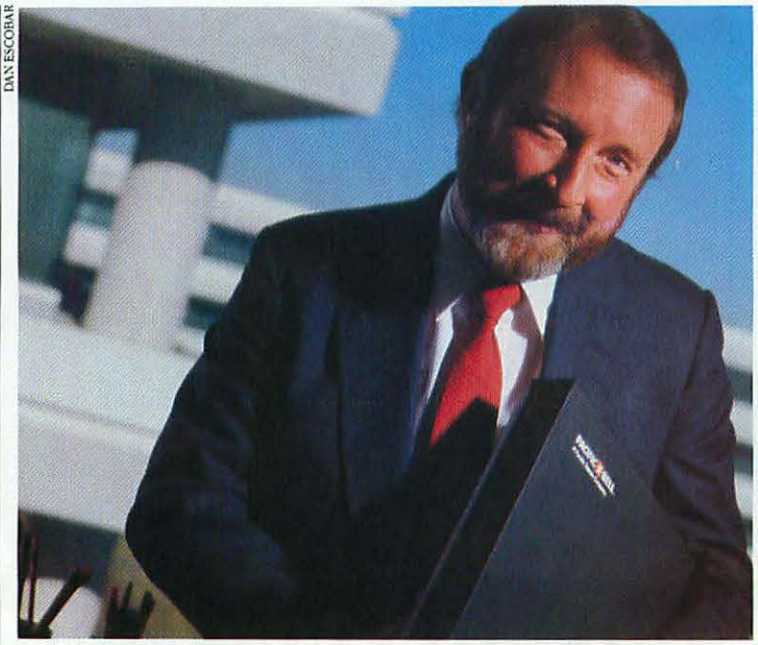
Market Pro (Pro Plus Software Inc., 2830 E. Brown Rd. #C-12, Mesa, AZ 85203, 602/830-8835) is one product that provides all three services (portfolio management, fundamental analysis, and technical analysis). Most stock market programs provide an interface to on-line services like Dow Jones News/Retrieval and CompuServe to retrieve stock prices and company information. *Market Pro,* however, uses an information service called I.P. Sharpe, which it claims provides a greater breadth of information than do other sources.—*Steve Mann*

Project Victoria

As Pacific Bell sees it, by late this year or early 1988, the modem will be obsolete, or at least old-fashioned. By that time Pac Bell hopes to have deployed its new multiplexer developed under the code name Project Victoria.

Currently, the typical two-strand telephone line carries only one analog transmission at a time, either voice communication or data transmission via modem; simultaneous transmissions are impossible.

DAN ESCOBAR



Pacific Bell's multiplexer will help make modems outdated, says Michael Eastwood, director of network applications.

With Pac Bell's black box hooking onto a single home-phone circuit, however, signals are digitized at the source, allowing one phone line to carry seven distinct transmissions at once: two voice channels, one 9600-baud data channel for high-speed access to information services and computer-to-computer connections, and four lower-speed data-transmission channels for data pertaining to, for example, interactive home-energy management, security systems, and community bulletin boards.

Pac Bell hopes the system's high transmission speed, plus the appeal of simultaneous voice and data transmission, will help revive a sluggish videotex industry. Pac Bell also hopes that the product's open architecture will encourage software and peripheral development, with Pac Bell itself positioned neatly, of course, as both the purveyor of the necessary hardware and the connecting link between information services and the end user.

In an initial four-month test concluded last August, two hundred homes were equipped with 512K Macs and Project Victoria multiplexers connected through Pac Bell to six information sources, including Dow Jones, MCI electronic mail, Bank of America's home-banking system, and three community bulletin boards. After the test was concluded, 90 percent of the users said they'd be willing to pay "something" for the service. The Public Utilities Commission has not yet decided what it will allow Pac Bell to charge. As the plan is now conceived, users will lease multiplexers from Pac Bell and pay for the connection through Pac Bell to the information services, as well as for the services themselves. Michael Eastwood, Pac Bell's director of network applications, believes that the total cost will be lower than that of typical modem-to-information-service connections now available.

Transmission of the multiplexer's digital signals is limited to roughly 18,000 feet from any Pac Bell central switching office. Fortunately for Pac Bell, 80 percent of the technology's potential users live well within those limits.—*Eric Olsen*

Software Ads

The SoftAd Group, a firm that specializes in developing computer-based marketing tools, has produced computer-based marketing materials for BMW, Chase Manhattan Bank, Chemical Bank, and Ford. One of the Sausalito, California-based company's current projects is an animated, interactive program designed to promote General Motors' 1987 Buicks. Originally developed on the Macintosh, this program has a database containing complete specifications for each Buick model, including optional features, technical fact sheets, and even purchase plans. The program allows consumers to select cars based on their primary concerns, such as price or trunk space. After you specify a set of features, the program displays the models that fill the selection criteria. When you find a suitable model, the program prompts you to fill in financial information and then calculates the monthly payments. And to top it off, the program prints out a certificate good for a test drive at your local dealer.

The software will be distributed through direct mail and direct response ads, but could eventually be distributed through automobile dealers or downloaded via an on-line toll-free number.

JAMIE TANAKA



SoftAd's Paula George uses the Mac to create marketing tools for GM's Buick division.



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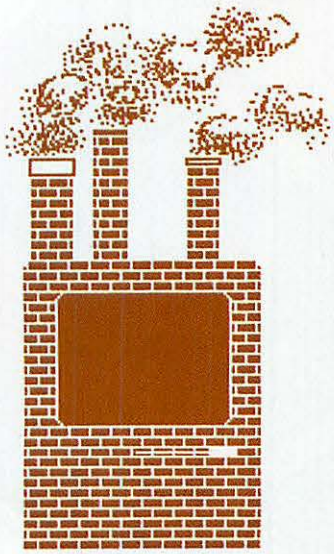
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Mac Factory

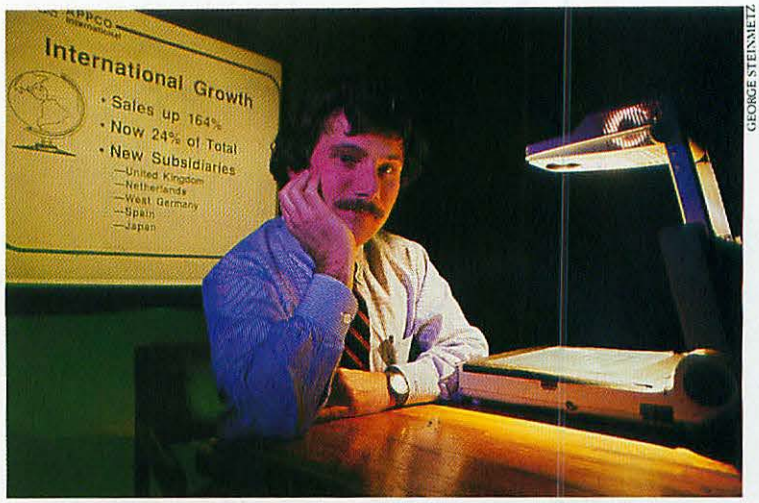
Back in 1981, while Steve Jobs and the Apple dream team toiled through 70-hour weeks on the design of what became the Macintosh, a few team members slipped away to a separate lab to blueprint a factory for building Macs. It was then known only as "the machine that would build the machine."

Jobs suspected that to produce Macs in the United States, he would need technology that was highly automated and roboticized. The result was the Mac factory. With its high-speed robots, which work 24-hour days and rarely make a mistake, the factory requires less than half an hour of human labor to assemble a Mac, and about 90 percent of that is testing time. Analysts estimate Apple's per-unit cost is between $300 and $400, but the exact figure will probably always be a trade secret.

A Mac rolls off the production line about every 25 seconds, a time Apple is trying to cut in half before the one-millionth Mac is sold. Before being boxed and shipped, each machine is run through a rigid 24-hour burn cycle, during which it is turned on and off repeatedly and run through a host of simulations designed to test each individual chip on the logic board.

Macs are produced as they are ordered, with components ordered on a just-in-time basis. According to Debi Coleman, Apple manufacturing vice president, "95 percent of all delivered parts are off the floor in eight hours."

But unquestionably, the most amazing feature of the Mac factory is the number of critical assembly and test functions that are now monitored and controlled by Macs. Over two hundred of them are scattered throughout the factory, and many are networked via AppleTalk. Together they observe and communicate data from thousands of complex test and manufacturing functions every second, feeding their findings back to the mainframe Tandems. A new high-tech loop is being formed: the "machine that builds the machine" is increasingly being run by the computer it produces.—*Mark Dowie*



GEORGE STEINMETZ

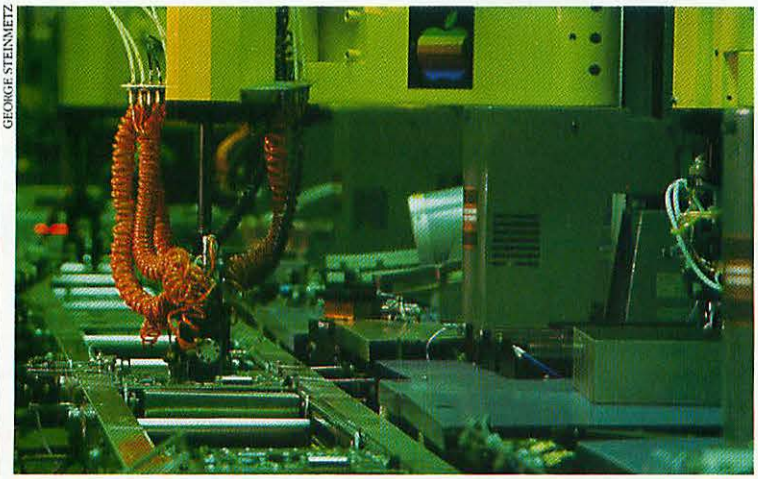
Forethought's Rob Campbell thinks the Mac is ideal for presentations, and his new product* PowerPoint *will help prove his claim.

Desktop Presentations

Presentations may soon follow publishing, communications, and engineering as the "desktop" theme trumpeted by Apple marketing campaigns, and Forethought's *PowerPoint* is likely to establish itself as one of the leading products in this field. The developer estimates that 10 to 15 million people regularly give presentations, which translates into over a billion slides and overheads produced each year. Forethought also believes that because less than 1 percent of the materials currently used in presentations are produced with computers, there's an obvious niche waiting for the right Mac software.

With full text editing and formatting capabilities, drawing tools, and patterns and lines for creating backgrounds and borders, *PowerPoint* is well suited to designing such presentation media as overhead transparencies and 35mm slides. You can import *MacPaint, MacDraw,* and TIFF files directly into *PowerPoint*.

A slide sorter allows you to look at slides in a reduced view and to rearrange, cut, copy, and paste them. Alternatively, you can rearrange the order of slides by rearranging the list of slide titles. In addition, you can integrate slides and notes into a document, laying out the elements as you like. The $395 *PowerPoint* also lets you set up a slide show on the Mac, which can be output to a video projector. For more information contact Forethought at 250 Sobrante Way, Sunnyvale, CA 94086, 408/737-7070, 800/622-9273.



GEORGE STEINMETZ

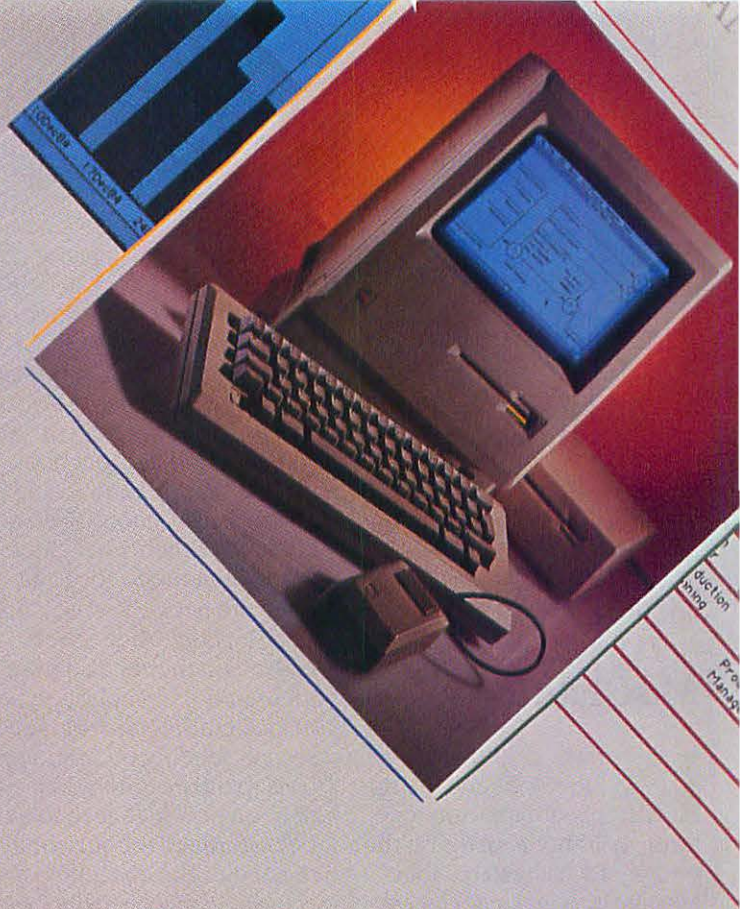
In Fremont, California, one of the world's most automated computer factories turns out two to four machines a minute.

Super Computers

At the San Diego Supercomputer Center (funded by the National Science Foundation and located on the UC San Diego campus), "super" is a relative term. In the conjunctive, "supercomputer" refers to the cen-

(continues)

Still drawing "Pretty Pictures" with MacProject?



Those in the know have switched from MacProject to MICRO PLANNER PLUS. Apple's own software and hardware engineers have switched to MICRO PLANNER PLUS for mainframe power made easy on the Macintosh™.

From the Venus Orbiter to business startups, managers are switching to MICRO PLANNER PLUS to get projects done on time and on budget.

R.D. Warshawer, Planning and Scheduling Manager, GTE/Government Systems, Strategic Systems Division — from his MICRO PLANNER review. "My evaluation of the software is that it is a superior package, very user oriented, with good documentation . . . The structure makes the maximum use of the Macintosh™ interface, allowing the user to become adept rather rapidly. Users who are familiar with the networking techniques will find this product falls between MacProject (a low-end planning tool) and Artemis (a super powerful mini/mainframe tool). In fact, this product appears to have similar functionality to the Artemis system . . . **For those who find MacProject inadequate** . . . and Artemis too much for their needs, MICRO PLANNER PLUS should be an excellent tool . . . One of the most important features . . . is the ability to save the 'plan' and assess progress against the plan as the actual work progresses. The lack of this capability is what makes MacProject's use extremely limited."

MICRO PLANNER for Macintosh

From 'Project Management' by Barry Keating, *Macazine,* June 1986 —**"Carl Sanchez, Chief of Planning for the Launch Control Systems Divisions of Martin Marietta . . .** As an individual who must both plan and control projects, he has used both MacProject and MICRO PLANNER PLUS (as well as mainframe versions of project management software such as Artemis). While he 'cut his teeth' on MacProject . . . Sanchez believes MICRO PLANNER PLUS to be a much more powerful tool for practitioners than Macproject. Many people at Martin Marietta use MICRO PLANNER PLUS not only for its power but because its learning curve is quite short . . . (less than a day for some people) . . . MICRO PLANNER PLUS has the best training curve of the project management software."

Another user who has switched from MacProject to MICRO PLANNER PLUS is Mike Krueger of Natural Intelligence . . . Krueger, like Carl Sanchez, started out using MacProject but soon found that his job required the sophistication found in MICRO PLANNER PLUS. MICRO PLANNER PLUS is . . . being used to develop the schedule for producing Natural Intelligence's first product . . .(software with an expert systems or artificial intelligence capability).

MacProject is a simpler tool . . .not designed to adequately handle . . . reconciling time . . . with resources. **The logic of Macproject is nonstandard** and may cause some early misunderstanding to experienced users.

Now it's easier than ever to move up to the power of MICRO PLANNER PLUS. **MICRO PLANNER's new PROJECT EXCHANGE module allows you to convert MacProject files to MICRO PLANNER projects.** Move up from "pretty pictures" to sophisticated management.

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Super Computers (continued)

ter's primary organ, the Cray X-MP/48. This awesome number-cruncher requires a super-cooled circulatory system to keep its 66 miles of wire and hundreds of circuit boards from melting down while it simultaneously services two hundred academic and nonprofit researchers. The Cray does in seconds what had taken each scientist hours to accomplish on traditional dedicated mainframes.



GEORGE STEINMETZ

The San Diego Supercomputer Center's Serge Polevitzky is sold on the Mac as an intelligent workstation for the Cray.

However, "supercomputer" is increasingly used at the center to refer to the Macintosh, as SDSC users discover that Macs make superior front-end workstations for terminal access to the incredible power of the Cray.

Inspired by the visit, Sam Holland, Apple's manager of advanced computer development, arranged an immediate donation of seventy Macintoshes, forty Hard Disk 20s, thirty-five 800K external drives, and ten LaserWriters. Apple's seed to the center is already paying off.

SDSC is one of four computer centers being established by the NSF under a $200 million program mandated by Congress to support basic academic and nonprofit research to narrow the gap between the supercomputer "haves" and "have-nots." In fulfilling its charter to educate researchers in supercomputer use, the center routinely sets up a classroom full of Macs for a week-long, hands-on course called "Supercomputer Users Training." Students come from the 25 member institutions that share access to the Cray through the Supercomputer Center Consortium. Intensive sessions alternate between lectures by world-class computer scientists and hands-on access to the Cray via the Mac.

Each monthly course offering sees a diverse cross-section of visiting researchers from such consortium members as the Salk Institute for Biological Studies, the National Optical Astronomy Observatories, the Scripps Institution of Oceanography, the Southwest Fisheries Center, the Agouron Institute, and the Research Institute of the Scripps Clinic, as well as a host of prestigious private and state universities.

The center now has 83 Macintoshes. When not outfitting the student lab, Macs enable the center's 90 full-time staff members to communicate with each other via Ethernet and AppleTalk networks and RS-232 cabling.

On center director Sidney Karin's desk is a Levco Prodigy that facilitates the transfer of his research from mainframe to Macintosh. The hope is that he'll get "spoiled" and want to upgrade many of the center's current Macs to Prodigies, giving SDSC the edge in accessing the capabilities of the next generation of Macs.

MathWriter

J. Robert Cooke and Ted Sobel, of the agricultural engineering department at Cornell University, tried using *MacEqn,* a mathematical typesetting desk accessory, to typeset part of a manual they were developing on finite element programs. But because *MacEqn* lacked some essential features, Cooke and Sobel were forced to develop their own program.

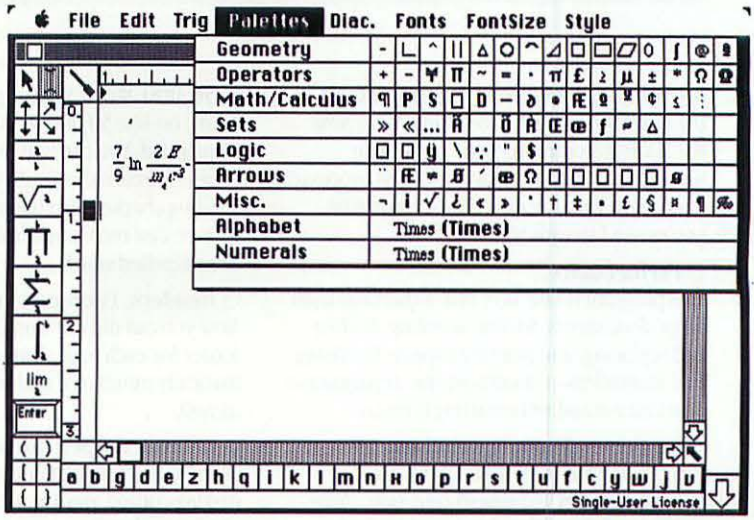
MathWriter, the fruit of their labors, automatically sizes and places superscripts, subscripts, parentheses, fraction bars, matrices, and integral and summation symbols. It is also quite adept at formatting equations; for example, you can stretch or shrink an equation to fit the available space while maintaining the width-to-height ratio, even after pasting an equation into a word processor document. You can also create overlay screens and manually superimpose multiple characters for closed-contour integral symbols. On-screen palettes provide quick access to the Greek alphabet and the most common mathematical structures; in addition, you can create a user-defined palette of expressions or symbols.

You can save *MathWriter* files as *MacPaint* or *MacDraw* documents and print them on the LaserWriter or ImageWriter. The current version of *MathWriter* isn't compatible with the widely used TeX mathematical typesetting language, but the program's developers are working on a conversion utility. For more information contact Cooke Publications at P.O. Box 4448, Ithaca, NY 14852.

More Graphics at Your Fingertips

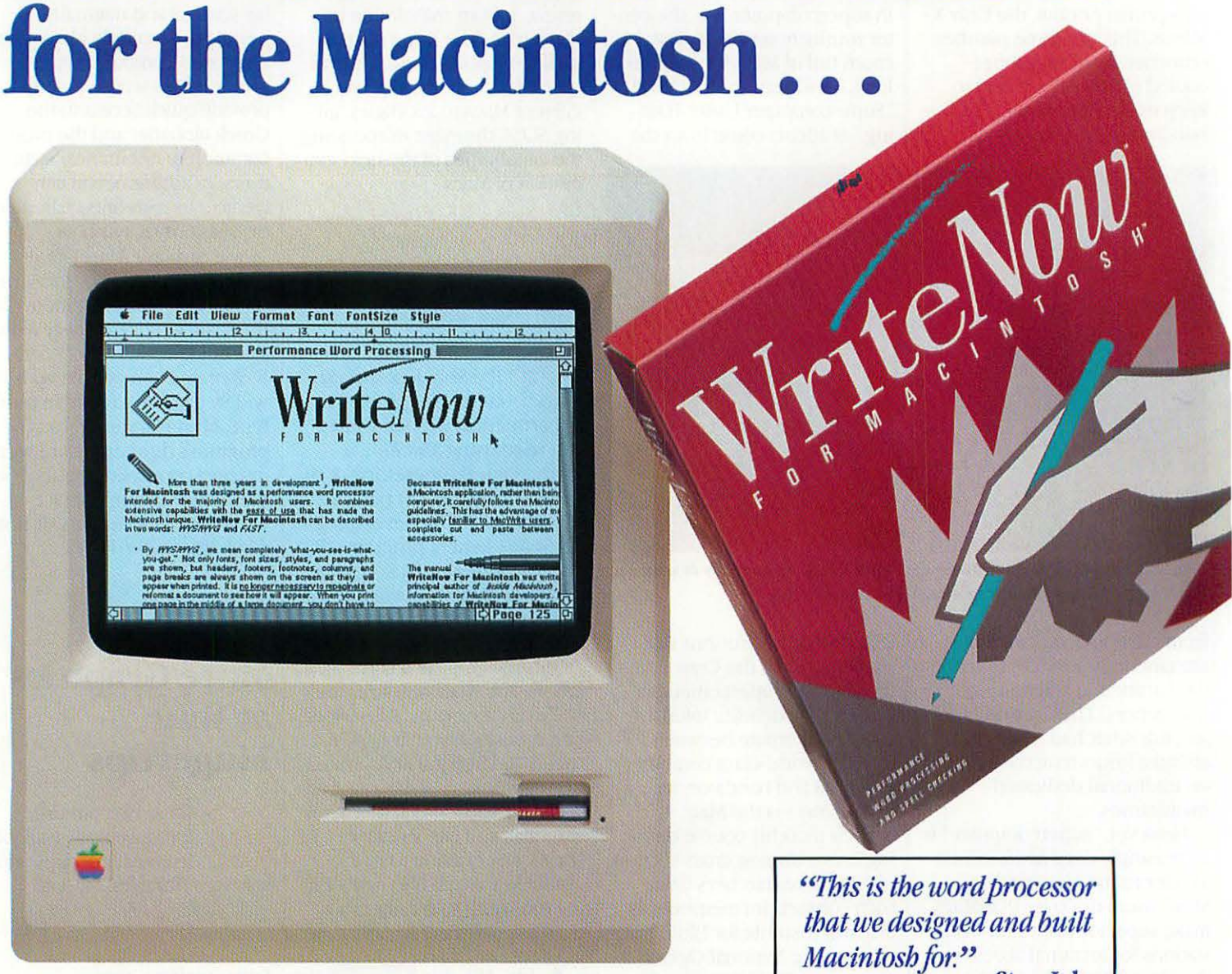
Over two hundred fonts are now available from user groups and software libraries. Most of

(continues)



Writing equations is not a simple task on the Mac, but* MathWriter *is designed to format mathematical expressions without hassle.

Best New Word Processor for the Macintosh . . .



"This is the word processor that we designed and built Macintosh for."
Steve Jobs

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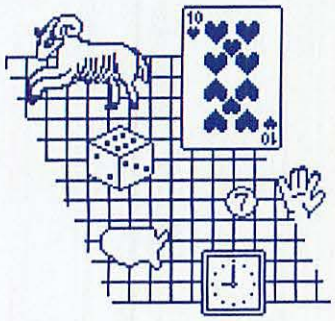
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More Graphics at Your Fingertips (continued)

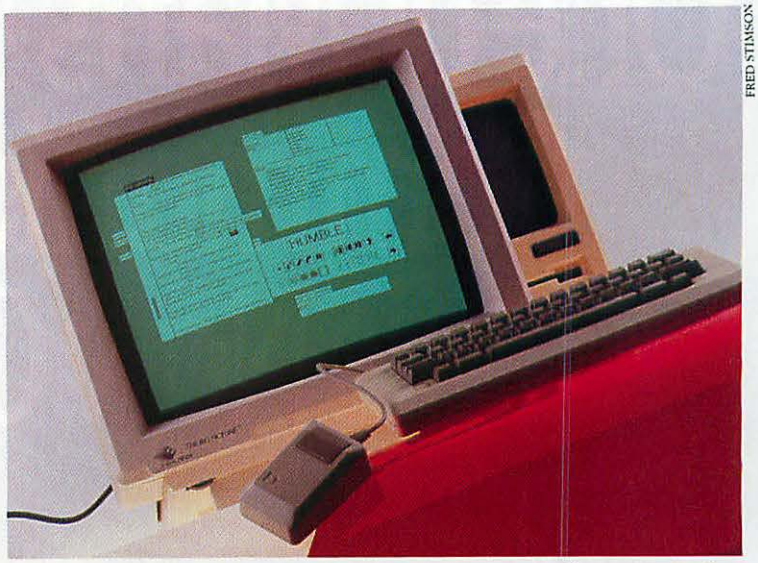
these fonts, which are free except for the cost of a disk or a downloading fee, are text or display fonts. Some of the fonts, like Cairo or Mobile (aka Taliesin), consist of pictures. And while many of these picture fonts are collections of miscellany, some are composed of graphics related to a central concept.

Cupertino-24, for example, is filled with such items as pointers, (tiny) windows, dialog-box talking heads, check boxes, the sad Mac and Trash Can icons, and other desktop paraphernalia. Paint-18 concentrates almost entirely on *MacPaint* items, from the Spray Can to Brush shapes and the Hand tool.



Washington-12 (by Martin Bryant) is composed of various lines, intersections, and corners to use in the construction of simple forms containing boxes, fill-in-the-blanks, and so forth. Border-12, on the other hand, is designed for more decorative embellishments. Two other fonts are based on alternative forms of human communication. ASL Fingers contains hands signing letters and numbers in American Sign Language. And Braille-12 and -24 are, well, Braille.

Other fonts are one-of-a-kind. Boutn-24 is a collection of letters, numbers, and signs within buttons (including "Panic," of course). Floor Plan-9 and -24 (by Maurice Naragon) are collections of tables, chairs, sofas, bathtubs, hot tubs, pianos, swimming pools, and other household furnishings as viewed from above. States-24 displays the outlines of all 50 states plus a tiny drawing of the lower 48. Las Vegas-36 contains various views of dice, plus a complete deck of cards. And Zodiac-18 (by R. Ettore) has all the signs of the astrological calendar, rendered in a rather florid style. While few if any of these picture fonts are likely to be essential additions to your font menu, they can greatly expand your graphics repertoire. *–Robert C. Eckhardt*



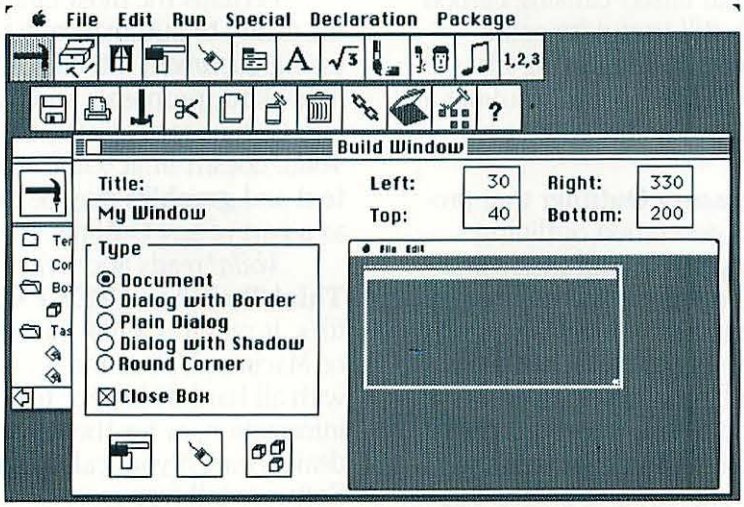
FRED STIMSON

An expert-system microcomputer workstation on the cutting edge.

Prototyper

Transforming an idea into a working program can take years for a substantial application. SmethersBarnes of Portland, Oregon, has introduced a prototype creator to help Macintosh software developers conceptualize programs without actually programming. *Prototyper* doesn't necessarily reduce coding time for a final design, but it does eliminate the months of programming required to build a demo, and lets you test out program design concepts easily. You build menus, windows, and buttons and specify actions using a set of menu commands and tools represented by icons.

Prototyper is primarily a communications tool that lets managers communicate design concepts to product managers, engineers, technical writers, and even potential investors. "Proposing an idea for a program graphically with the Macintosh user interface intact is clearly much more effective than a written specification," says Paul Smethers, one of the program's principal developers. For more information contact SmethersBarnes at 800/237-3611, 503/245-7270 in Oregon.



***Creating prototypes–demos that let you test out program design concepts–is the job of SmethersBarnes's* Prototyper.**

The HUMBLE Prodigy

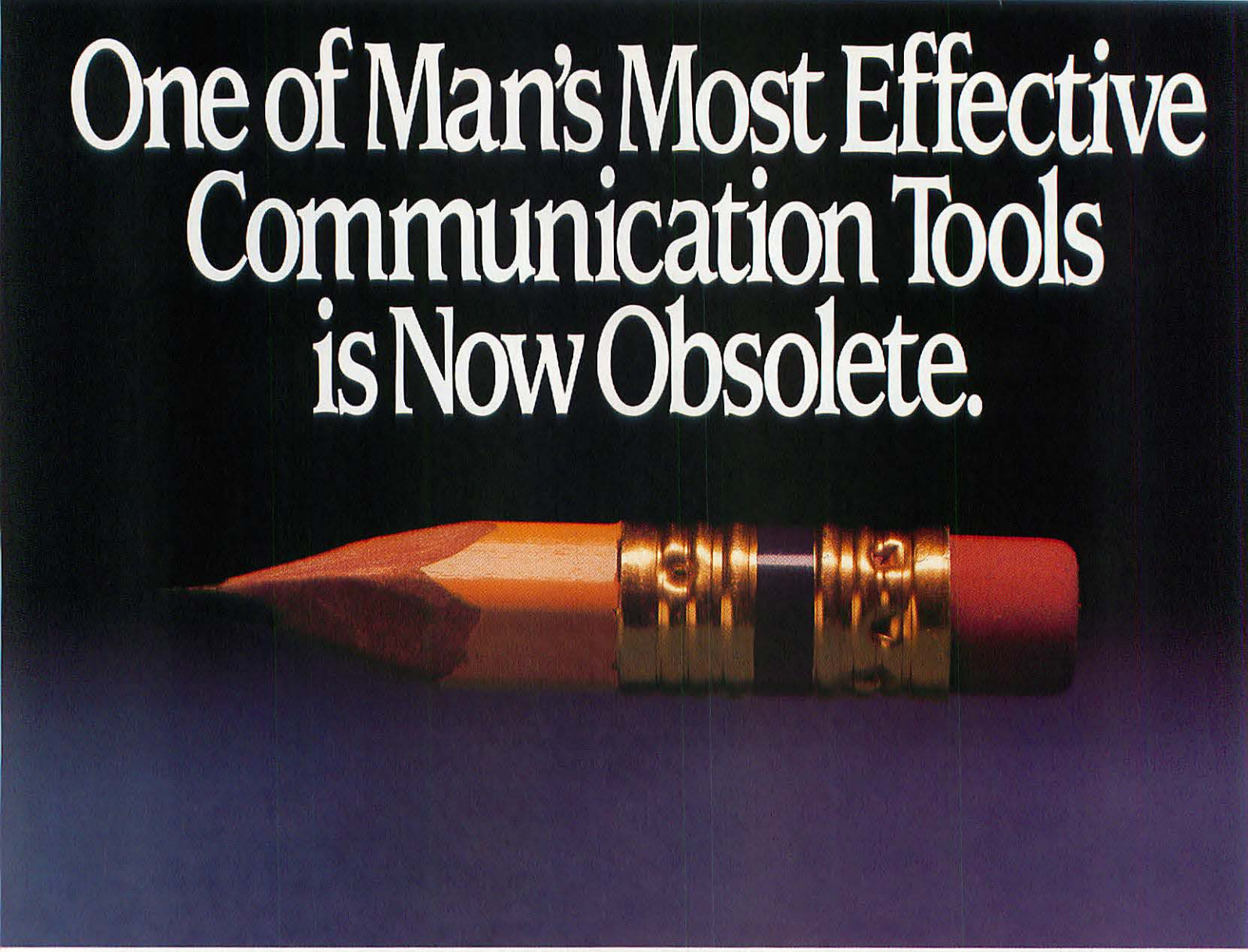
Xerox Special Information Systems (XSIS) and Levco have created a powerful microcomputer expert-system workstation. And while this state-of-the-art workstation probably offers a bit more power than you need, several scaled-down configurations allow any Macintosh owner to acquire this powerful yet user-friendly AI development environment. It is based on the XSIS software product *HUMBLE,* a *Smalltalk-80* expert system shell.

Most *Smalltalk-80* workstation owners pay several thousand dollars for the basic operating environment license, which they then enhance with the $500 *HUMBLE* expert system shell extension. Macintosh owners, however, can get started with only a $50 investment for the prerelease *Smalltalk-80* (version .3) from the Apple Programmer's and Developer's Association (APDA).

Consistent with the open *Smalltalk-80* environment, *HUMBLE* is delivered with complete source code on a sin-

(continues)

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Perhaps the most innovative feature of *Voila!* is the ability to automatically transform any word processing document into an Outline, in seconds. Business plans, proposals and manuscripts are converted into Outline format with the click of a mouse! And *Voila!* doesn't limit you to the written word. Both **text** and **graphics** may be included as a part of any Outline.

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The HUMBLE Prodigy (continued)

gle-sided Mac disk and a reference manual. Customized *Smalltalk-80* editor/browsers give *HUMBLE* users hierarchically organized access to multiple knowledge bases. Each knowledge base can use shared rules in multiple contexts. *HUMBLE*'s inference engine supports both forward and backward chaining and is capable of reasoning under user-controllable certainty models. Built-in explanation facilities provide complete, concise English-sentence and tree-structured graphic descriptions of the line of reasoning leading to the best solution. They also chart less likely alternatives.

Using the Macintosh Toolbox routines with *HUMBLE* allows you to create one of the fastest and most versatile expert-system display interfaces available on any commercial Smalltalk workstation.

With regard to hardware, you need a Macintosh with at least 1 megabyte (the more the better) of RAM; a hard disk is desirable. An ideal configuration would be a souped-up Mac like a Levco Prodigy (with 4 megabytes of RAM, a 16-MHz 68020 microprocessor, and a 68881 math coprocessor); an upgraded Mac SE or Mac II; a hard disk; and a large screen. The cost of a complete workstation is several times the cost of a basic Macintosh computer, but it is still far less expensive than traditional Smalltalk workstations.

For more information on Xerox's *HUMBLE* expert system shell, contact David Yorck, Xerox Special Information Systems, P.O. Box 5608, Pasadena, CA 91107, 818/351-2351.

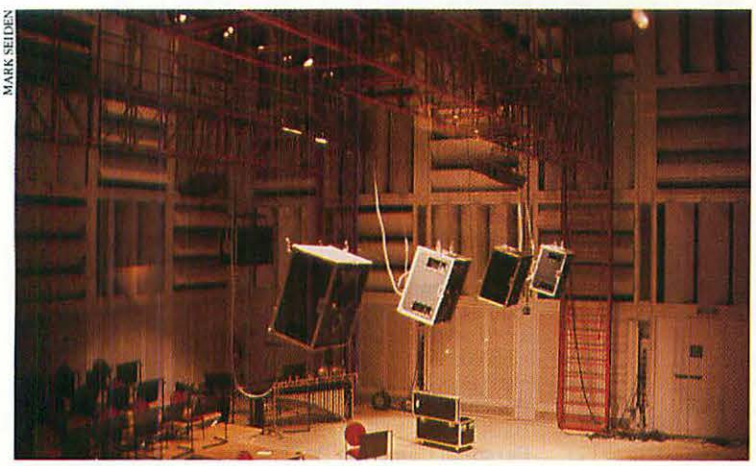
World's Largest Mac Peripheral

At least five Macintosh software packages are being developed by researchers associated with IRCAM (the Institut de Recherche et Coordination Acoustique/Musique), the world's foremost music research facility. These packages include software for mixing digital recordings and automating MIDI-controllable analog mixers; an FM synthesis editor for Yamaha's popular DX and TX synthesizer series, which converts spectral information into patch data; and the porting of IRCAM's renowned *Formes* composition program to a special musical extension of *Le Lisp* (from Act Informatique) known as *MIDI Lisp*.

In addition, IRCAM is now using a Macintosh to manipulate the acoustic properties of its main performance hall, the Espace de Projections (ESPRO). The walls and ceiling of ESPRO have 171 three-part panels, each of which may be adjusted to exhibit one of three acoustic properties: reflection (the sound is reflected along a single plane), diffusion (the sound is reflected from a three-surface prism at different angles), and absorption (sound is not reflected). Three mixed positions, such as absorption/reflection, are also available. Furthermore, the ceiling is divided into three parts, which may be raised and lowered independently. All of this provides control of the inherent acoustic properties of the room, such as volume and resonance. The ESPRO can even be tuned to reinforce a specific musical key.

IRCAM's Adrian Freed and Mark Seiden have developed *Automation de Priacs,* a Macintosh program designed to control the acoustics of the ESPRO performance space. The user literally paints (with patterns similar to *MacPaint*'s) the acoustical properties of the walls on the Macintosh screen, which presents a two-dimensional view of the room's four walls and ceiling. Motors move the actual panels to the positions that provide the reflection, diffusion, absorption, or mixed properties painted on the screen—real-time interaction is also supported. The acoustic modeling of the panel configurations may have taken up to two days of dedicated VAX computation time to derive. The resulting design, exhibiting the desired acoustical properties, can be saved and recalled instantly. Well, almost instantly; the panels take about ten minutes to move, and although their settings are saved in the file, the lowest row of panels cannot be moved automatically. Anyone standing in front of one of the 75 non-motorized panels could be injured when it moved. This is truly the largest Macintosh peripheral in the world. *—Christopher Yavelow*

MARK SEIDEN



The Macintosh is used to manipulate the 171 acoustic panels of the main performance hall at IRCAM, the world's most prestigious music research facility.

JEFFERY NEWBURY



The King of Chicago

The King of Chicago, a Cinemaware strategy game, is an interesting cross between a classic gangster-film plot, an interactive novel, and an animated adult cartoon. The personalities of your character and the characters you interact with change slightly every time you make a decision. For example, giving your moll, Lola, the cold shoulder makes your enemies and gang respect you more. On the other hand, Lola will be more vulnerable to the charms of your rivals. If *The King of Chicago* has an educational aspect—other than as a lesson in gangster behavior and history—it's that the only way to reach the top is to apply the right amount of violence, bribery, threat, betrayal, leadership, and savvy. For more information contact Mindscape at 800/221-9884, 800/942-7315 in Illinois. *—Otto Waldorf* □

All creatures ma

SOFTWARE

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Cricket Draw *(advanced draw capabilities)* 179.
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MacInooga Choo-Choo *(512k, NCP)* 21.
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SuperGreek New or Old Testament 79.
MacGreek/Hebrew/Phonetics 89.
LaserGreek 79.
LaserFrench/German/Spanish 79.
LaserCyrillic 115.
Living Videotext ... NCP
ThinkTank 512k *(outline processor)* 99.
More *(outlines, windows, & tree charts)* .. 159.
MacMemory ... NCP
MaxRam & MaxPrint *(Ramdisk, spooler)* .. 39.
Magnum ... NCP
Natural Sound Effects 27.
Natural Sound Cable & Editor Disk 89.
McPic - Volume 1 or Volume 2 29.
The Slide Show Magician 1.3 *(CP)* 35.
Microsoft
Flight Simulator *(the Mac takes flight, CP)* 33.
Learning Multiplan and Chart *(2 disks, CP)* 39.
Basic Interpreter 3.0 *(NCP)* 59.
Chart 1.0 *(42 chart styles, CP)* 72.
Multiplan 1.1 *(63 col. by 255 rows, CP)* ... 111.
File 1.04 *(flexible data manager, NCP)* ... 111.
Word 1.05 *(word processor, CP)* 111.
Basic Compiler 1.0 *(NCP)* 119.
Fortran 2.2 *(compiler, NCP)* 169.
Works 1.0 *(integrated tool, NCP)* 189.
Excel 1.03 *(power spreadsheet, NCP)* ... 225.
Miles Computing ... NCP
Mac the Ripper *(req. Paint program)* 27.
Mindscape ... CP
The Luscher Profile *(personality profile)* ... 24.
The Perfect Score: SAT 47.
ComicWorks *(create your own comics)* 49.
GraphicWorks *(newsletters, ads, posters)* 49.
Monogram ... NCP
Forecast *(tax planning)* 41.
Dollars & Sense *(home, small business)* ... 81.
New Canaan MicroCode ... NCP
MDCFinder *(requires 512k)* 20.
Mac Disk Catalog II *(requires 512k)* 32.
Odesta ... NCP
Helix *(req. 512k, external drive)* 105.
Double Helix *(relational, custom menus)* 289.
Palantir ... CP
MathFlash or WordPlay 26.
MacType *(typing instruction)* 26.
Inventory Control, GL, or AR *each* 59.
inTalk *(communication to emulation, NCP)* 79.
PBI Software ... NCP
Icon Switcher *(customized icons)* 14.
Icon Fun & Games or Business Libraries .. 14.
HFS Locater *(DA organizer for HFS)* 27.
Hard Disk Backup *(supports MFS, HFS)* .. 29.
Peachtree ... CP
Back to Basics GL, AP, or AR *each* 89.
Personal Computer Peripherals ... NCP
HFS Backup 39.
ProVUE Development ... NCP
OverVUE 2.0 *(power-packed database)* .. 149.
Mail Manager Template 29.
Personal Finance Template 29.
Rubicon Publishing ... CP
Silver Palate Collection *(NY's finest!)* 29.
Dinner At Eight *(recipes to wines)* 35.

Programming Bugs.



Betty Faber investigates the stuff dreams are made of.

Putting out feelers.

"They spend most of their time feeding, grooming, and interacting with friends. Their courtship dance consists of a lot of wing flapping, erratic running, and backing into things. The males tend to stay out late at night, and are much more obvious and vulnerable."

Sound familiar? Well, don't jump to any hasty conclusions. Contest winner Betty Faber is describing cockroaches. She is one of the foremost authorities in the world on their behavior. But any similarity between the characters in her research and personal friends of yours (or ours) is purely coincidental. We think.

Bugs 'R us.

Betty has been studying cockroaches for eleven years. She's spent endless days in the jungles of Trinidad, and endless nights in the greenhouse at the American Museum of Natural History in New York studying every gesture of her own tagged private collection. This lady knows from cockroaches.

But she didn't know from micros—until the Mac came along. Here at last was a machine that, like Betty, had the ability to make friends with the most unlikely life forms. She uses Excel extensively, particularly for analyzing "homerange" data—how far which roaches will roam to do what. She also uses Microsoft Word to write papers, and MacPaint to draw home-range maps for presentations.

Overall, the Mac has made it possible for Betty to spend a lot more time with her six-legged buddies. Which, from her point of view, is a good thing.

And, what about you? Is there anything creepy or crawly in your Mac? Your story could be worth a grant of $500 in free add-ons and software. So bug us with your true Mac adventures soon!

Contest Winner #5

Name: Betty Faber, Ph.D.
System: Mac 512
Applications: Analyzes the habits of cockroaches.

"My Connection"

MacConnection

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MacConnection.

MacroMind ... NCP
Maze Wars+ *(play via modem or network)* $32.
Miles Computing ... CP
MacAttack *(3D tank simulation)* 27.
Harrier Strike Mission *(3D flight simulation)* 27.
MacWars *(3D space simulation)* 27.
Mindscape ... CP
Racter *(converse with your Mac!)* 27.
Balance of Power *(world politics)* 30.
King of Chicago *(req. minimum 512E)* 30.
Brataccus *(great graphics, req. 512k)* 30.
Uninvited *(mystery adventure)* 30.
Deja Vu *(murder mystery)* 33.
Origin Systems ... CP
Exodus: Ultima III *(fantasy adventure)* 38.
PBI Software ... CP
Strategic Conquest *(multi-user)* 35.
Psion ... CP
Psion Chess *(3D and multi-lingual)* 31.
QWare ... CP
Orb Quest *(graphic fantasy adventure)* . . . 29.
Sierra On-Line ... CP
Championship Boxing *(knock 'em out!)* . . . 25.
Silicon Beach Software
Airborne! *(CP, the classic!)* 20.
Enchanted Scepters *(CP, over 200 scenes)* 21.
Dark Castle *(NCP, arcade action)* 28.
World Builder *(NCP, program creator)* 42.
Simon & Schuster ... CP
Star Trek—The Kobayashi Adventure 24.
Sir-Tech ... CP
Mac Wizardry *(high-rated fantasy)* 36.
SPHERE, INC. ... NCP
(Formerly Spectrum Holobyte)
GATO *(submarine simulation)* 26.
Orbiter *(space shuttle simulation)* 27.
Tellstar II *(No. & So. hemispheres, req. 512k)* 32.
XOR ... NCP
NFL Challenge *(be the coach!)* 79.

HARDWARE

Manufacturer's minimum limited warranty period is listed after each company name. Some products in their line may have longer warranty periods.

Apricorn ... 1 year
ApriCord Mac *(Mac Plus parallel interface)* 75.
Curtis Manufacturing ... lifetime
Diamond *(6 outlets)* 29.
Emerald *(6 outlets; 6 ft cord)* 36.
Sapphire *(3 outlets; EMI/RFI filtered)* 47.
Ruby *(6 outlets; EMI/RFI filtered; 6 ft cord)* . 55.
Dove Computer ... 1 year
MacSnap Memory Upgrades see special
Ehman Engineering ... 1 year
800k External Disk Drive 225.
Ergotron ... 1 year
MacTilt *(includes external drive bracket)* . . . 75.
MacBuffer 512k call
MacBuffer 1024k call
Hayes ... 2 years
Smartcom II *(communications software)* . . 89.
Smartmodem 1200 or 2400 call
InterBridge *(connect Appletalk networks)* 599.
IOMEGA ... 90 days
Bernoulli Box *(dual 10 MB w/SCSI)* 1649.
Bernoulli Box *(dual 20 MB w/SCSI)* 1895.
Bernoulli Box *(dual 10 MB, Appletalk)* . . . 2195.
Kensington ... 1 year
Appletalk Cable Clips or Connectors. *each* $1.
Mouseway *(mouse tracking pad)* 8.
Mouse Pocket *(for your idle mouse)* 8.
Mac Plus System Saver Cover 9.
Imagewriter (II) Dust Cover 9.
Mouse Cleaning Kit w/Mouse Pocket 17.
Disk Case *(holds 36 Mac disks)* 19.
Disk Drive Cleaning Kit 20.
Tilt/Swivel 22.
Universal Copy Stand 24.
Polarizing Filter 34.
Surge Suppressor 35.
A-B Box *(for the Mac Plus)* 65.
Control Center 65.
System Saver Mac *(complete with fan)* 65.
Turbo Mouse 89.
Koala Technologies ... 90 days
KAT Graphics Tablet 139.
MacVision *(digitizer)* 175.
Kraft ... 1 year
3 Button QuickStick 49.
Mirror Technologies ... 1 year
FastPort *("SCSI" for your 512k Mac)* 139.
Magnum 800k External Drive 229.
MagNet 20x *(w/MacServe)* 849.
Magnum 20 Tape Backup 929.
MagNet 30x *(w/MacServe)* 995.
MagNet 40/40 *(40MB, 40MB tape)* 2695.
MagNet 85x *(w/40MB tape)* 4595.
Personal Computer Peripherals ... 1 year
MacBottom Hard Drive 20MB *(serial)* 879.
MacBottom Hard Drive 20MB *(SCSI)* 879.
MacBottom Hard Drive 30MB *(SCSI)* 999.
MacBottom Hard Drive 40MB *(SCSI)* . . . 1295.
Summagraphics ... 90 days
MacTablet 6" x 9" *(stylus driven)* 299.
MacTablet 12" x 12" *(sketching)* 389.
Systems Control ... 2 years
MacGard *(surge protection)* 55.
Thunderware ... 90 days
Thunderscan *(high-resolution digitizer)* . . 179.
Western Automation ... 1 year
DASCH RAMdisk 1000k 379.
DASCH RAMdisk 2000k 459.

DISKS

Single-sided Diskettes
Sony 3½" Disks *(box of 10)* 15.
MAXELL 3½" Disks *(box of 10)* 15.
Verbatim 3½" Disks *(box of 10)* 16.
Fuji 3½" Disks *(box of 10)* 15.
3M 3½" Disks *(box of 10)* 18.

Double-sided Diskettes
Sony 3½" Disks *(box of 10)* 23.
MAXELL 3½" Disks *(box of 10)* 23.
Verbatim 3½" Disks *(box of 10)* 24.
Fuji 3½" Disks *(box of 10)* 24.
3M 3½" Disks *(box of 10)* 25.

INFORMATION SERVICES

Compuserve
Compuserve Information Service 24.
Dow Jones
Dow Jones News/Retrieval Membership Kit . 24.
Source Telecomputing
The Source *(subscription & manual)* 30.

ACCESSORIES

Automation Facilities
Floppiclene Drive Care Kit $15.
Floppiclene Refill *(ten cleaning disks)* 10.
MacPak Complete Care System 29.
Clean Image Ribbon Co.
Clean Image Ribbon Kit 12.
Computer Coverup
External Disk Drive Cover 4.
Imagewriter (II) Cover 8.
Mac (Plus) & Keyboard *(two covers)* 10.
Diversions
Underware Ribbon *(iron-on black transfer)* . . 9.
Multi-color Transfer Ribbon 19.
ColorPack *(includes Colorpens)* 19.
I/O Design
Imageware II *(Imagewriter II carry case)* . . . 59.
Macinware Plus *(Mac Plus carry case)* 69.
Innovative Concepts
Flip & File Micro *(holds 25 disks)* 9.
Flip & File *(holds 40 disks)* 18.
Innovative Technologies
The Pocket Pak *(holds 6 disks)* 10.
The Easel *(holds 20 disks)* 15.
The Disk Directory *(holds 32 disks)* 18.
The Library *(carousel, holds 80 disks)* 29.
Kalmar Designs
Teakwood Roll-top Case *(holds 45 disks)* . . 15.
Teakwood Roll-top Case *(holds 90 disks)* . . 22.
Magnum
Mouse Mover *(let your mouse ride!)* 14.
Moustrak
Moustrak Pad *(standard 7" x 9")* 8.
Moustrak Pad *(large 9" x 11")* 9.
Ribbons Unlimited
Imagewriter Black or Color Ribbons. 5.
Imagewriter Ribbons Six Pack 25.
Smith & Bellows
Mahogany Disk Case *(holds 90 disks)* 28.

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- Allow 1 week for personal and company checks to clear.
- UPS Next-Day-Air available.
- COD max. $1000. Cash or certified check.
- 120 day limited warranty on all products.*
- To order, call us anytime Monday thru Friday 9:00 to 9:00, or Saturday 9:00 to 5:30. You can call our business offices at 603/446-7711 Monday through Friday 9:00 to 5:30.

SHIPPING

Note: Accounts on net terms pay actual shipping. **Continental US:** For printers and drives add 2% for UPS ground shipping (call for UPS Blue or UPS Next-Day-Air). For all other items, add $2 per order to cover UPS shipping. We will automatically use UPS 2nd-Day-Air at no extra charge if you are more than 2 days from us by UPS ground. **Hawaii:** For printers and drives, actual UPS Blue charge will be added. For all other items, add $2 per order. **Alaska and Outside Continental US:** Call 603/446-7711 for information.

cro and micro call

Dinner At Eight-Silver Palate Bundle $59.

Satori ... NCP
BulkMailer *(mailing lists)* 75.
BulkMailer Plus *(up to 90,000 names)* ... 225.
Legal Billing *(attorneys to accountants)* .. 389.
Project Billing *(architects to engineers)* ... 449.

Silicon Beach Software ... NCP
Accessory Pak 1 *(useful utilities)*..... 21.
Silicon Press *(printer utility, 512k)* 42.
SuperPaint *(advanced graphics program)* . 55.

Simon & Schuster ... NCP
Mac Art Department *(req. Paint program)* . 24.
Paper Airplane Construction Kit..... 24.
Typing Tutor III *(learn to type!)*..... 35.
J. K. Lasser's Income Tax..... 59.

SoftStyle ... NCP
Colormate Art *(Colormate images)*..... 29.
Colormate *(color printing utility)*..... 49.
Laserstart *(Hewlett-Packard Laserjet)*..... 59.
Decision Map *(make better decisions, CP)*. 79.

Software Discoveries ... NCP
Record Holder *(data manager)* 42.

Software Ventures ... NCP
Microphone *(communications)* 59.

Solutions, Inc. ... NCP
SmartScrap & The Clipper..... 45.
Glue *(creates "print to disk" capability)* ... 45.

Softview
MacInTax *(Federal income tax prep)* 69.
MacInTax *(California supplement)* 29.

Springboard
Art a la Mac Vol. 1-People & Places *(NCP)* . 23.
Art a la Mac Vol. 2-Variety Pack *(NCP)* 23.
Easy as ABC *(ages 3-6, letters, CP)*..... 29.
Early Games *(ages 2-6, counting, CP)*.... 29.

State of the Art ... CP
Electric Checkbook *(print checks)* 29.

Survivor Software ... NCP
MacMoney *(financial planner)* 45.

Symmetry ... NCP
Acta *(outline/writing desk accessory)*..... 39.
PictureBase *(clip art manager, 512k)* 45.

T/Maker ... NCP
ClickArt Personal Graphics..... 29.
ClickArt Effects..... 29.
ClickArt Publications..... 29.
ClickArt Letters Vol. 1 or Vol. 2..... 29.
ClickArt Holidays *(Easter)*..... 29.
ClickArt Business Image..... 29.
Bombay, Plymouth, or Seville Laser font ... 59.
Write Now *(word processor)*..... 119.

Target Software ... NCP
Merriam Webster's Thesaurus..... 29.
MacLightning *(interactive spell checker)* .. 53.
Medical or Legal Dictionary..... 53.
Voila! *(desk accessory outliner)* 53.

MacConnection Special of the Month
through April 30, 1987

DOVE COMPUTER
MacSnap Memory Upgrades

Designed for either a 512k Mac, or a MacPlus, MacSnap memory upgrades offer "greater productivity." Several models are available; all 100% compatible with your Mac's operating system and the new Apple ROMs.

- up to 60% increase in performance
- easy installation, no soldering required
- full one year warranty
- includes a RAM disk, and Apple's Switcher™

MacSnap 524 *(512k to 1MB)* $149.
MacSnap 548 *(512k to 2MB)* 399.
MacSnap Plus 2 *(MacPlus to 2MB)*... 269.

This is a partial listing. Please call for additional MacSnap specials.

Telos Software ... CP
Business Filevision *(512k, external drive)* . 199.

Think Educational ... CP
MacEdge II or Mind Over Mac..... 28.

Think Technologies ... NCP
Laserspeed *(Laserwriter utility)*..... 69.
Lightspeed Pascal *(includes debugger)*... 89.
Lightspeed C *(top-rated C Compiler)* 129.

TML Systems ... NCP
TML Source Code Library 59.
TML Pascal *(compiler, req. 512k)*..... 69.

TrueBasic ... NCP
True BASIC *(fast, flexible & portable)* 89.
Algebra II, Pre-calculus, Calculus, Trigonometry, 3D Graphics, Discrete Math, Probability & Chippendale utilities ... *each* 36.
TrueSTAT *(statistics)* 59.
Runtime *(create stand-alone applications)* . 59.

Unicorn ... CP
Animal Kingdom *(ages 6-12)* 29.
Decimal Dungeon *(math, ages 9 and up)*.. 29.
Fraction Action *(arcade style math game)* . 29.
Mac Robots *(pre-school program)*..... 29.
Math Wizard *(math games, ages 5-10)*.... 29.
Read-A-Rama *(reading, ages 5-8)*..... 35.

William & Macias ... NCP
myDiskLabeler *(design & print labels)* 25.
myDiskLabeler w/Color *(req. Imagewriter II)*. 34.
myDiskLabeler w/Laserwriter option 39.

GAMES

Accolade ... CP
Hardball *(baseball simulation)* $27.

Activision ... CP
Championship Star League Baseball..... 22.
Mind Shadow *(Who am I?)*..... 27.
Hacker *(you're on your own!)*..... 27.
Hacker II *(breach Russian computer)*..... 30.
Borrowed Time *(murder mystery)*..... 27.
Shanghai *(Mah Jongg strategy)*..... 27.
Alter Ego *(male or female version)*..... 36.

Addison-Wesley ... CP
Puppy Love *(your dog will love it!* 15.

Ann Arbor Softworks ... CP
Grid Wars *(3D graphic arcade)* 22.

Artworx ... CP
Bridge 4.0 *(sharpen your skills)* 21.

Avalon Hill ... CP
MacPro Football *(req. 512k)*..... 32.

Blue Chip ... CP
Millionaire *(stock market)*..... 35.
Tycoon *(commodities)* 35.
Baron *(real estate)* 35.
Squire *(personal finance, req. 512k)*..... 35.

Broderbund Software ... CP
Lode Runner *(over 150 levels)* 24.
Ancient Art of War *(military strategy)*..... 27.
Toy Shop *(create working models)*..... 39.

Bullseye ... CP
Ferrari Grand Prix *(Formula One racing)*... 35.
Fokker TriPlane Flight Simulator..... 35.

Electronic Arts ... CP
Archon *(arcade strategy, req. 512k)*..... 27.
Skyfox *(3D graphics)* 27.
One on One/Dr J vs Larry Bird *(req. 512k)*.. 27.
Patton-vs-Rommel *(req. 512k)* 27.
Pinball Construction Set..... 27.

Epyx ... CP
Rogue *(strategy dungeon classic!)*..... 24.
Temple of Apshai *(4 levels)*..... 24.
Winter Games *(Olympic events)*..... 24.

Hayden Software ... CP
Perplexx *(scrabble-type game)* 24.
Sargon III *(9 levels of chess)*..... 29.

Infinity Software ... CP
Grand Slam *(tennis, req. 512k)*..... 28.

Infocom ... CP
Leather Goddesses of Phobos, Hitchhiker's Guide, The Witness, Wishbringer, Enchanter, Trinity, Moonmist, Ballyhoo, Cutthroats, Zork 1 *(standard)* *each* 24.
Zork II, Zork III, Sorcerer, Suspect, Mind Forever Voyaging *(advanced)* *each* 26.
Spellbreaker *(expert)* 29.
Invisiclues *(hint booklets)*..... *each* 6.

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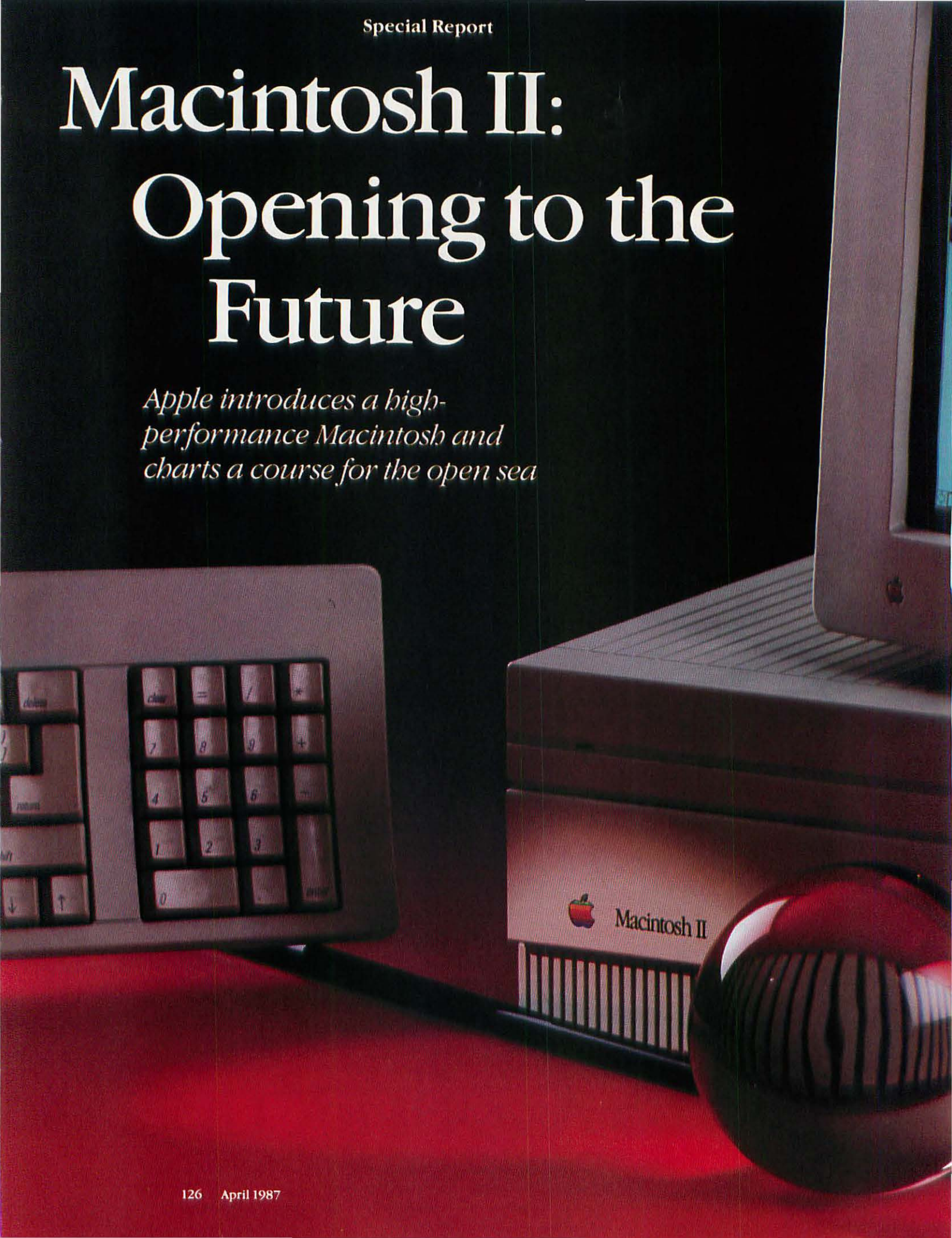
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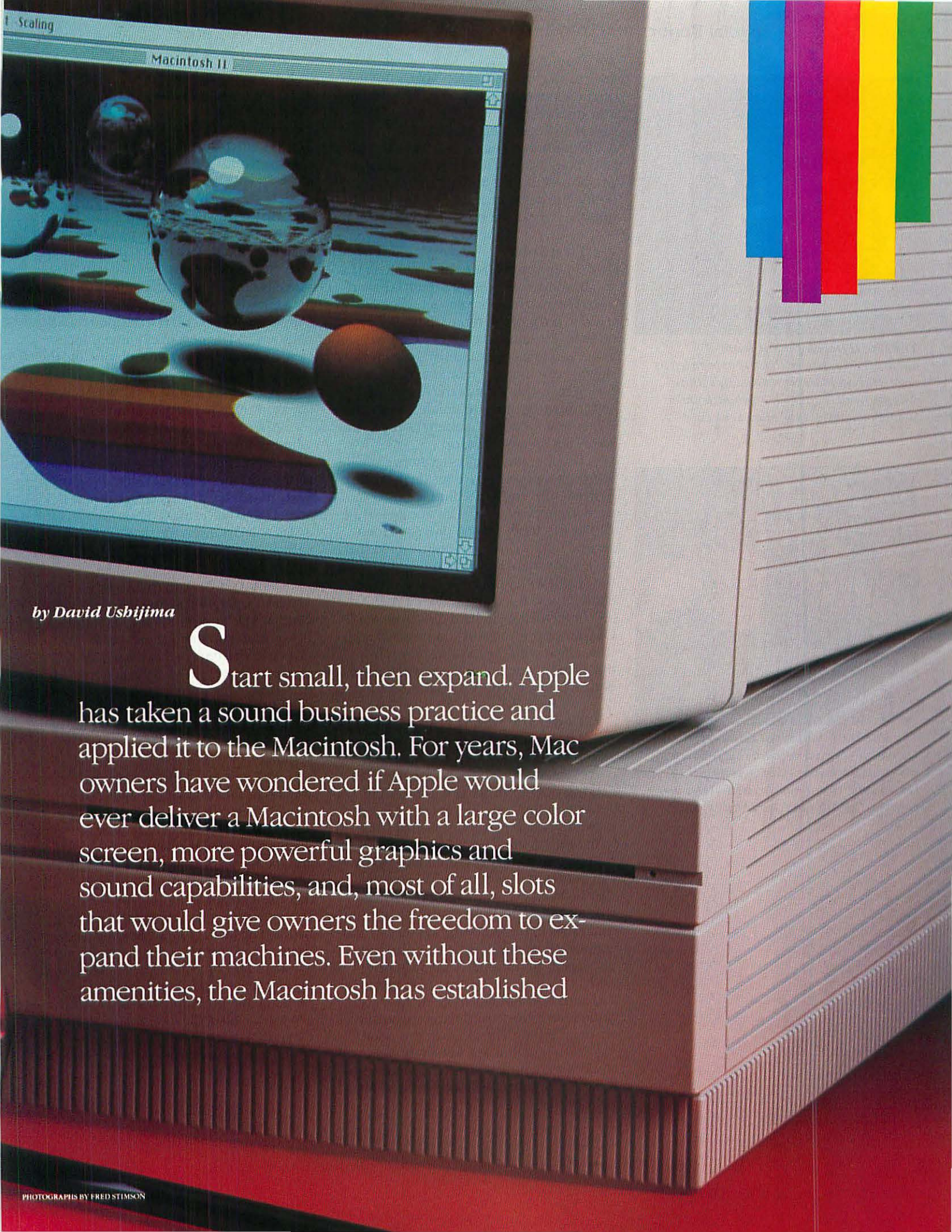
All items subject to availability. Prices subject to change without notice.

*Defective software replaced immediately. Defective hardware replaced or repaired at our discretion. Some items have warranties up to five years.

Macintosh II: Opening to the Future

Apple introduces a high-performance Macintosh and charts a course for the open sea





by David Ushijima

Start small, then expand. Apple has taken a sound business practice and applied it to the Macintosh. For years, Mac owners have wondered if Apple would ever deliver a Macintosh with a large color screen, more powerful graphics and sound capabilities, and, most of all, slots that would give owners the freedom to expand their machines. Even without these amenities, the Macintosh has established

PHOTOGRAPHS BY FRED STIMSON



The Mac II Development Team–I
The Mac II's designers: (back row, from left to right) Michael Blanchard, Bruce Lee, Dave Wilson; (front row) Dave Turnbull, Jennifer Weinstein, Ralph Pastor, Mark Lentczner.



The Mac II Development Team–II
The Mac II's designers: (back row, from left to right) Bill Mackenzie, Alan Oppenheimer, Ron Hochsprung; (front row) Brian Berkeley, Toby Farrand, Roy Askeland, John Medica, Mike Dhuey.

itself as the leader in affordable, graphics-oriented personal computers. Now Apple introduces the high-performance Macintosh II and opens up the possibilities of a colorful future–one in which a powerful CPU along with a raft of intelligent coprocessor-based cards and peripherals will define the next generation of personal graphics workstations.

First Look

When you first see the Macintosh II, you'll wonder whether it's really a Macintosh. The machine breaks out of the Mac mold in favor of the more traditional approach–the familiar compact cabinet is gone, and in its place is a handsomely designed base unit and monitor whose sculpturing resembles that of the Apple IIGS. Unfortunately, the base unit leaves a LaserWriter-size footprint, making its presence sorely felt on your desktop.

Because the Mac II sacrifices a small footprint for more space inside the cabinet, it overcomes one of the limitations of its predecessors: internal disk storage. While earlier machines had no provision for a second floppy drive and only limited space for internal hard drives, you can configure the Mac II with either a second 3.5-inch 800K floppy disk drive or an internal 20-, 40-, or 80-megabyte hard disk from Apple. Of course, you can still add external SCSI drives, and with the existing drives from third-party companies, there will be plenty of disk drives to choose from.

Under the Hood

The Macintosh II, powered by a Motorola 68020 running at 16 megahertz, comes standard with the Motorola 68881 floating-point coprocessor. In addition, you get 1MB of RAM, an internal 800K floppy drive, and six expansion slots that conform to the NuBus standard (see "Looking at the NuBus"). To configure a minimal system, you must add a keyboard–you can now choose from two–and a color or monochrome video card and monitor. The video card plugs into the NuBus, so you can add various color or monochrome cards and displays from third-party manufacturers, as well as from Apple. Beyond that, you can add hard disk storage, more memory, and NuBus cards from third-party manufacturers (see "Filling The Slots" in this issue).

With previous Macintosh models, your choices were limited; with the Macintosh II, however, you can choose from an abundance of options. You can configure a minimal system with a monochrome display and floppy disk storage for under $4300; or, for under $6000, you can build a color hard disk system that will rival the performance of color workstations costing twice as much.

Horsepower to Spare

Immediately after you press the power switch on the keyboard, you get a tantalizing preview of the goodies to come. The start-up sound I heard could have passed for a chord played by a steel drum quartet. (Apple engineers had not decided on a final sound.) The new machine produces stereo sound with amazing clarity, and the machine I used sounded all the more impressive with the addition of two Bose speakers attached to the stereo sound port.

After a few seconds of wondering whether this was a Macintosh or an entirely different animal, I saw the familiar start-up screen followed by the desktop. With all that has changed on the Mac II, it's somehow comforting to know that it is still a Mac at heart. Even the desktop is basically unchanged from its previous incarnation.

Although you can run Apple's UNIX System V operating system (A/UX) or the familiar Mac operating system on the Mac II, you can't run them at the same time (see "An Open Forum" in this issue). Apple foresees a separate market for engineers, scientists, designers, universities, programmers, and businesses that need a standard UNIX workstation, while the majority of users will opt for the familiar Mac operating system.

The new Mac I ran had a preliminary version of a revised Finder and System, although they differed little from the Mac Plus Finder and System. The Trash Can bulges when you throw something in it, and the hands of the watch spin while you are waiting–though Apple engineers said that the software shipped with the machine might not implement the spinning hands. The Mac II's Finder menus underwent only minor changes: the Shut Down command now turns the machine off and a Restart command has the same effect as pressing the programmer's Reset switch on a Mac Plus. Also, Cleanup Selection and Cleanup Window commands have been added to the Special menu.

Looking at the NuBus

The NuBus, first developed at the Massachusetts Institute of Technology, was later used by Western Digital in the Nu-Machine. Subsequently, Texas Instruments incorporated the NuBus into its Explorer artificial intelligence workstation. Representatives from Texas Instruments, MIT, AT&T, and Apple, among others, formed a committee to standardize the bus under the auspices of the Institute of Electrical and Electronic Engineers (IEEE). The NuBus used in the Mac II is actually slightly different from the specification developed by the IEEE Microprocessor Standards Committee.

Exploring the Bus

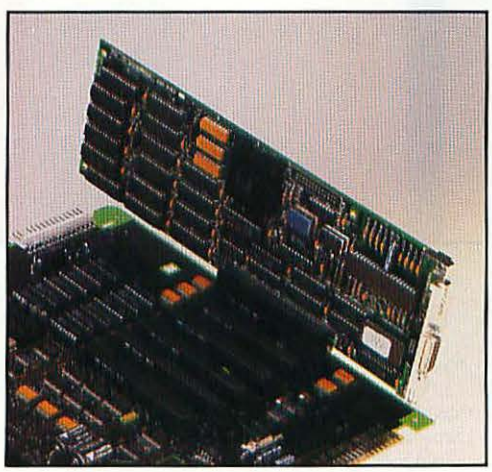
The NuBus was designed to transfer information, in the form of electrical signals, between elements of a computer system like the CPU, memory, and various controllers. NuBus signals travel synchronously at a rate of up to 10 megahertz. The bus consists of 96 signal lines, including 32 bits of address and data, utility, and control lines, as well as power and ground signals.

One of the strengths of the NuBus is that it defines simple rules, called the bus protocol, by which up to 16 boards, or devices, can coexist on the bus. Apple chose to include only 6 slots in the Mac II.

Unlike boards for the IBM PC expansion bus, the boards you plug into the NuBus slots do not require any address jumpers. In fact, each board includes a configuration ROM that contains information, such as an initialization program and device drivers. The system reads the contents of the configuration ROM and installs the board automatically when you turn on the machine.

Since only one device, called the bus master, can control the bus at any one time, the boards vie for control of the bus through a scheme called bus arbitration. Unlike other bus arbitration methods, the NuBus gives each device a fair chance to become the bus master. Even the Mac II's CPU vies for control of the bus just like any of the six NuBus devices. Because the Mac II's NuBus was designed to coordinate the operations of up to seven processors, including the 68020 on the motherboard, very powerful systems can be built by combining cards with processors dedicated to functions like communications, graphics, and array processing.

NuBus Slots
By plugging cards into the six NuBus slots, you can expand the basic features of the Mac II. Because the cards are self-configuring, you don't need to set address switches or install special software.



Slots, Super Slots, and the NuBus

Each NuBus card can access the full 4 gigabytes of memory, including the Mac II's program and system RAM. In addition, a NuBus master can control any of the Mac's peripherals: the SCSI port or the AppleTalk or modem port, for example.

The Mac's CPU communicates with the NuBus cards by reading and writing to and from memory locations that have been set aside specifically for the NuBus. When you are running Mac system software, the top 256MB of the 4-gigabyte address space bits, called slot space, are divided into 16 areas of 16MB each. In this mode, Mac software can only access 1MB of the six areas reserved for the Mac II's slots. When the Mac runs 32-bit-mode software, like UNIX, or when a NuBus card has control of the bus, a much larger area, called super slot space, is set aside for each of the six NuBus cards. Each super slot space contains 256MB.

The Mac Shows Its Colors

With the color machine powered up, the only major change you'll notice (and you'll have to look closely) is the small Apple icon displayed in color. Currently the Finder doesn't take full advantage of color. In December, Apple engineers were still finalizing guidelines for the use of color in menus and on the desktop. Until they reach a conclusion, the Finder you'll see on the Mac II will be black and white. However, because the Toolbox has been revamped for color, any application, including future versions of the Finder, can use color.

The Mac II's graphics display depends entirely on the video display card and monitor you choose. Using Apple's 4- or 8-bit color card, you can show off the Mac's screen graphics in either razor-sharp monochrome or color that is nearly photographic in quality (see "A Mac of a Different Color").

I saw several demonstrations of color images that had been digitized on a $15,000 color scanner and then processed on a VAX. Although the images were dithered, they were displayed with incredible clarity and accuracy.

And this is only the beginning. The Mac II's color drawing routines are capable of recording 32 bits per pixel (over 4 billion colors). Because the video card plugs into a NuBus slot, other manufacturers can produce their own cards, which could extend the Mac II's video capabilities to rival the best graphics displays and image processors available today.

Unlike the IBM PC, which can only run graphics applications written for the video card installed, the Mac II's color graphics applications need not know which video card is installed. This is what makes the new Mac so powerful: its color display system is totally independent of the application software.

A Competitive Performer

If you've ever wished for a Macintosh with more speed, you'll have fun keeping up with this one. After I opened a few windows and started two or three applications, the difference in performance was energizing. Windows snapped open and shut, menus responded instantly, and I could scroll through text and graphics documents much faster than I ever could on a Plus. The Macintosh II's 68020 CPU offers at least a fourfold increase in performance over the Mac Plus, and the 68881 coprocessor can implement applications that rely on numeric calculations up to 200 times as quickly. If you use three-dimensional graphics or other calculation-intensive applications, you'll have cause to celebrate.

AppleTalk programs will take advantage of devices attached to the NuBus.

The new CPU's increase in performance results from its ability to read 32 bits at a time—twice as many as the 68000—and the fact that it runs at twice the speed of the previous generation of Macs. In addition, the 68020 contains a built-in instruction cache, thereby storing 256 of the most recently used bytes in fast memory, and an efficient coprocessor interface that off-loads numeric calculations to the 68881 coprocessor and address translations to the 68851 Memory Management Unit. The Mac II has the power and sophistication that until recently could only be found in a minicomputer or workstation.

Just for the sake of comparison, I ran a few standard benchmarks. Even though the machine I ran had a preliminary version of the system software, the results can give you an idea of the kind of performance to expect. I ran the Whetstone, a test that measures a machine's floating-point performance, the Dhrystone, an overall test consisting of a balanced mix of a CPU's instructions, and the sieve of Erastosthenes, a simple test using integer math, arrays, and branches. The results are shown in Figure 1. An alternative comparison would pit the Mac running UNIX against other machines running the same operating system, but that will have to wait until Apple releases its version of UNIX.

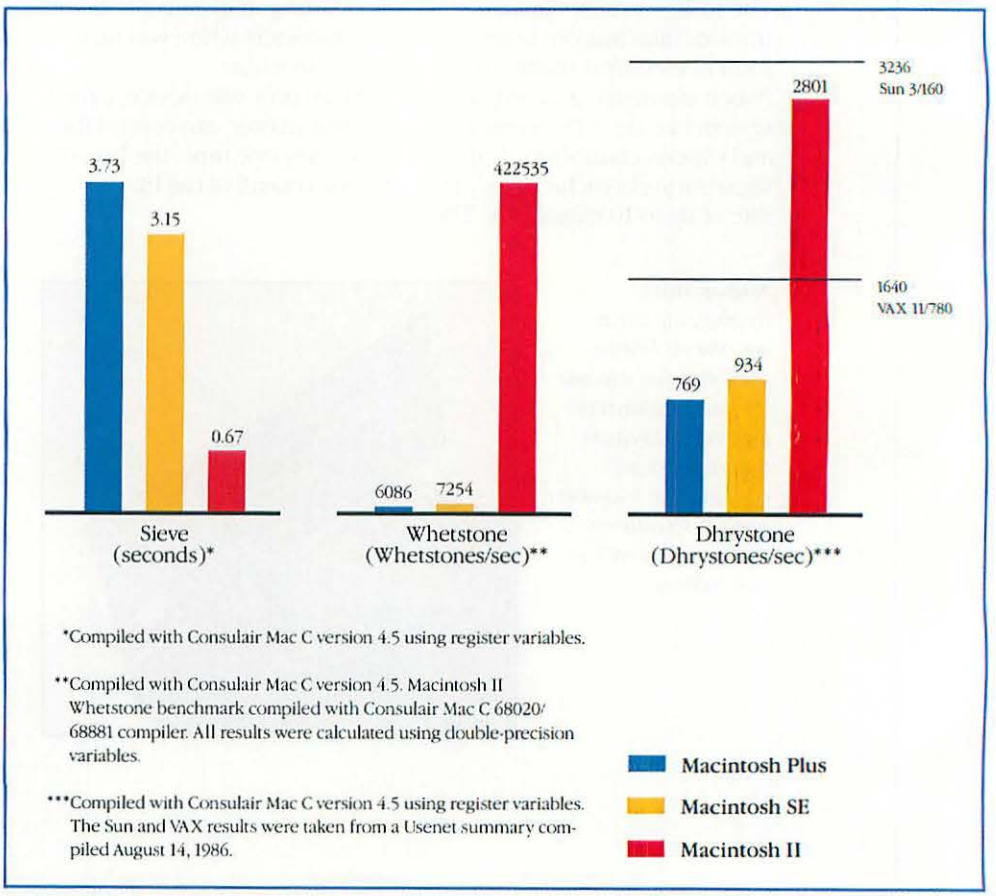


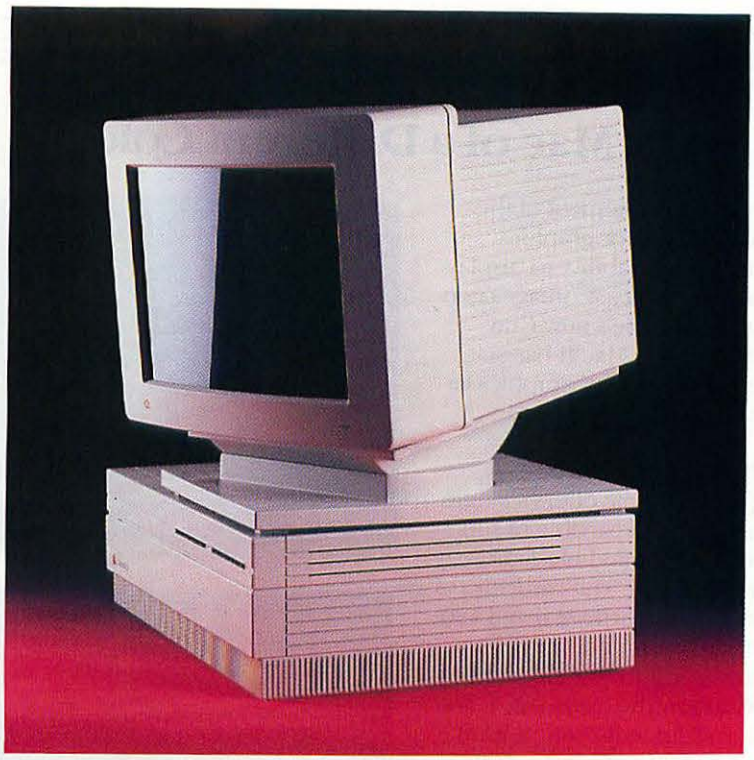
Figure 1
Benchmark comparison of the Macintosh Plus, the Macintosh SE, and the Macintosh II.

As a general test of the prototype Mac II's performance with existing applications, I ran *Excel, Microsoft Word* 1.05, and *WriteNow* 1.0. Apple claims that 95 percent of the existing Mac applications will run on the Mac II. A few programs, like *MacWrite,* will not, because they don't use the 68020's TRAP instructions properly. Games like Microsoft's *Flight Simulator* directly access the Mac's hardware and, as would be expected, won't run. However, the premature state of the system software made accurate compatibility testing impossible.

Room to Accelerate

Having plenty of horsepower does you no good without the room to run at full speed. Unlike the previous Macs' video RAM, the Mac II's is separate from the memory area where programs run. As a result, the CPU spends more of its time executing programs—it doesn't have to wait for the video-refresh circuitry to repaint the screen.

(continues)



Color Performance
The Mac II color monitor measures 13 inches diagonally and displays color images with a resolution of 69 dots per inch. It is shown here atop the Universal Monitor Stand.

UNIX Comes to the Mac

Never before has Apple sold and supported a nonproprietary operating system for any of its computers. That will change this summer when Apple starts shipping UNIX for the Macintosh II. Apple's A/UX UNIX conforms to System V, version 2, with many of the Berkeley 4.2 extensions added.

Apple also gives UNIX programmers access to the Mac's User Interface Toolbox, a feature that will encourage developers to write Mac-like applications for UNIX. Other enhancements that Apple has made include provisions for configuring the system on the Macintosh II and recovering files after system crashes.

Equipped with a NuBus Ethernet card, the Mac II will be able to connect to Ethernet networks. To further encourage the use of the machine in standard networking environments, Apple has added the Network File System protocol developed by Sun Microsystems, which lets the Mac II share files stored on over 35 other manufacturers' machines.

Apple's intent is to provide a UNIX that runs on the Mac II and completely adheres to industry standards. The product is aimed at users who need UNIX's multiuser and multitasking environment, strong communications and networking capabilities, and the abundant software development tools that are available. Although Apple's UNIX will manage up to 16 users, the company expects the machine to be used more as a powerful single-user UNIX workstation than as a multiuser system with "dumb" terminals attached.

Apple doesn't foresee A/UX replacing the Macintosh operating system. In fact, although UNIX is a multitasking operating system, you won't be able to run Macintosh applications as UNIX tasks. You will have to restart the Macintosh II in order to switch between the Mac's graphic user interface and the command-line interface employed by UNIX. A minimal single-user UNIX requires the 68851 PMMU, 2 megabytes of RAM, and a 40-megabyte hard disk. Apple recommends 5 megabytes of RAM and an 80-megabyte hard disk for a workable system.—*Lon Poole*

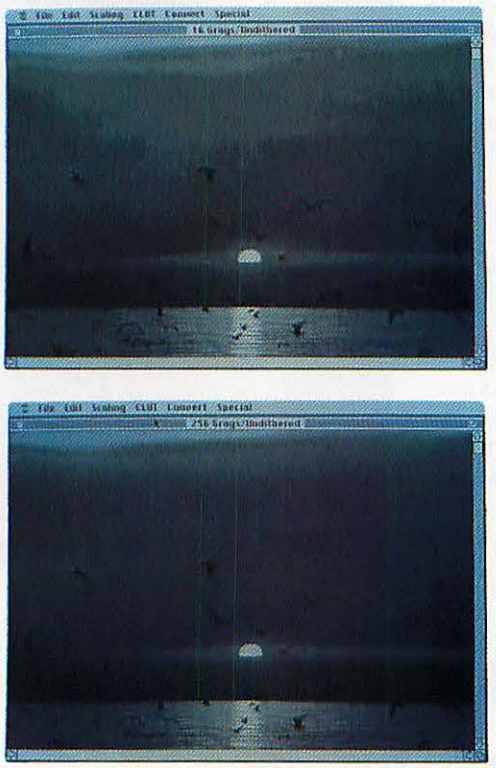
A Mac of a Different Color

Part of the excitement of the Mac II is its color graphics. Apart from its ability to display beautiful "ray cast" images generated on Apple's new Cray computer, the Mac II has surprisingly powerful graphics capabilities of its own.

What's on the Card

At present Apple offers a single graphics card, capable of supporting color and black-and-white displays. The card addresses 640 horizontal and 480 vertical pixels and operates with the number of bit planes selected by the user: 1, 2, 4, and (if an additional 256K of RAM has been added by the dealer or user) 8 bits. In color mode, then, the card may display black and white or 4, 16, or 256 colors simultaneously. Similarly, in monochrome mode the card may display black and white or 4, 16, or 256 shades of gray. The memory upgrades come in the form of eight 256-kilobit dynamic RAMs (DRAMs), which may be added by the dealer or by the user. The different modes of memory operation are selected in the color chooser (its name was still undetermined at press time) in the Apple menu.

The color chooser will incorporate functions that allow users to mix hue (the choice of a primary color), value (the mixture of primary colors), and chroma (the brightness or grayness of a color). The color chooser will also allow users to create and store palettes of color of their own choosing. The accompanying photograph demonstrates the range of 256 colors that may be selected and displayed from 16 million available colors.



Sunset in Grays

The Mac II with the Apple video card can display images using 16 or 256 shades of gray, depending upon how much video memory you install. To display 16 shades of gray, 4 bits of color information per pixel are required; a scale of 256 shades requires 8 bits per pixel. A dithering algorithm was used in the bottom image to give the appearance of more continuous shading. Continuous-tone gray-scale images require 256 shades.

Besides the half-megabyte of memory that can fit on the card, one chip is of particular interest—the custom graphics chip designed by Apple. The graphics chip and two separate timing crystals allow the video card to run in two modes: the interlaced mode, in which the electron gun of the CRT redraws the entire screen 30 times per second (like standard television), and the non-interlaced mode (similar to the Macintosh, which redraws the entire screen 70-plus times per second). By selecting the interlaced mode, users will be able to drive video screens and displays that accept RGB or RS-170A signals.

At present it is not possible to drive devices such as video cassette recorders or commercial televisions (those that use NTSC—North American Television Standards Commission—signals) directly from the Mac II. Rather, Apple hopes that third parties will supply the cards that will condition the electronic signals for "sync" and "gen-lock" requirements of commercial television. In fact, at present Apple supplies only two color monitors that can be operated with the video card: a 12-inch Sony monochrome display (capable of gray scale) and a 13-inch Sony color monitor (capable of both color and gray scale).

Use of color presents special needs, so software designers have developed two new data structures to handle them: color patterns and Pix Maps. Color patterns define the *dither,* or color combinations, available with color QuickDraw. They are particularly effective because 4 bits of memory, for

example, can simulate 125 colors, and 8 bits can simulate 256 colors. In short, the Mac II can display more color with less memory than a similarly equipped IBM PC, which at 4 bits of memory has only 16 colors to display. You have to press your nose close to the screen to see that colors are dithered and not displayed in continuous tones, as with color television.

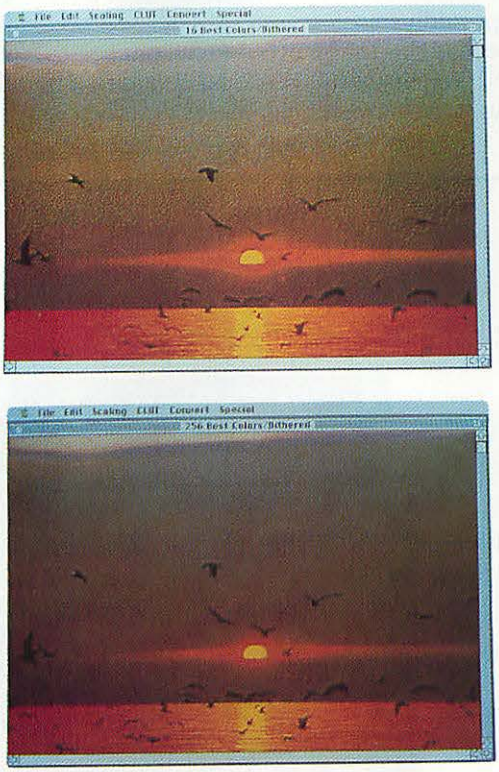
Pix Map is a bit-map extension that describes how pixels are stored. When Pix Map commands are used, other routines, such as Copy Bits, may be applied to multiple bit planes with a single command. Again, the result is more graphics capability from less memory.

It's Smart, but Is It Fast?

As with previous Macintoshes, the computer's microprocessor processes all graphics functions. The video card supports screen display memory, color, bus arbitration/communications, and alternate video operation modes. This approach diverges from that taken by many "high-performance" graphics cards, such as those supplied for IBM PC-family computers, which have their own graphics microprocessors (see "The Graphic Mac," *Macworld,* November 1986).

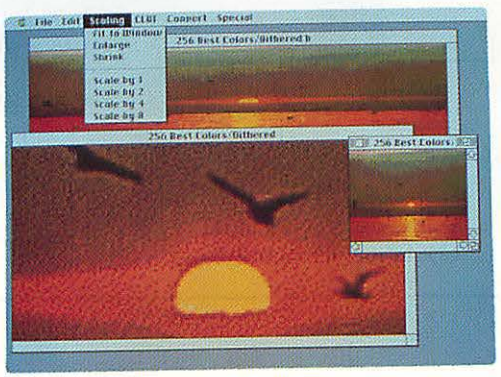
Apple defends the decision to burden the microprocessor with all graphics functions, pointing out that the Mac Plus already performs well in areas like drawing speed, even when compared with an IBM PC AT and an IBM-supplied graphics card.

It remains to be seen, however, whether graphics applications, such as mechanical design or animation, will be able to wring sufficient speed from the processor, given all the tasks it must handle. Should secondary processors be supplied for graphics, the high capacity of the NuBus will prove advantageous. Moreover, developers will not be able to rush in with a surfeit of graphics accelerators, as they did in the IBM market, because of the need to adhere to Macintosh resources, and because much of color QuickDraw has been incorporated into 125K of a 256K proprietary ROM. Certainly for graphic arts, some image processing, and paint applications, the existing graphics card is far ahead of any products supplied by IBM for its market. *–Jerry Borrell*



Sunset in Color

Apple's video card enables the Mac II to display images in 16 or 256 colors. The original image from which these screens were computed was digitized using 24 bits of color information per pixel. The top photo was created by replacing each pixel in the original image with the nearest matching pixel chosen from one of 16 colors. The bottom image was created in a similar fashion, using 256 colors.



Dithering for Effect

Although a Mac II equipped with Apple's video card can display up to 256 colors, a technique called dithering, *in which neighboring pixels alternate between two available colors, creates the illusion of many more.*

GRAPHICS BY MIKE POTEL AND JIM BATSON

Naturally, the new Mac's memory is expandable. The Mac II lets you expand RAM by adding Single In-line Memory Modules (SIMMs) like those used in the Plus. You can insert up to eight SIMMs into the Mac II's motherboard. The standard base unit comes with four 256K SIMMs, totaling 1MB of RAM; a second bank of four SIMM sockets is empty. You can expand memory to 2MB by adding four more 256K SIMMs. Apple expects 1-megabit RAM chips to be available in quantity in late 1987. At that time you'll be able to purchase the base unit with 4MB and plug in four more 1MB SIMMs to get a total of 8MB on the main board. Apple predicts that as higher-density chips become available, you'll be able to plug in 4MB and 16MB SIMMs that will let you put up to 64MB and 128MB, respectively, on the main board, although Apple's marketers don't foresee the higher-density chips being available until at least 1990.

If you need to go beyond 8MB, the NuBus expansion slots will let you add 1MB per slot when running the Macintosh system software. NuBus memory cards will be available from third parties like AST Research, but because of the NuBus address restrictions with the standard Macintosh system, most cards will be designed to run with software that uses 32-bit addressing, for example, the UNIX operating system.

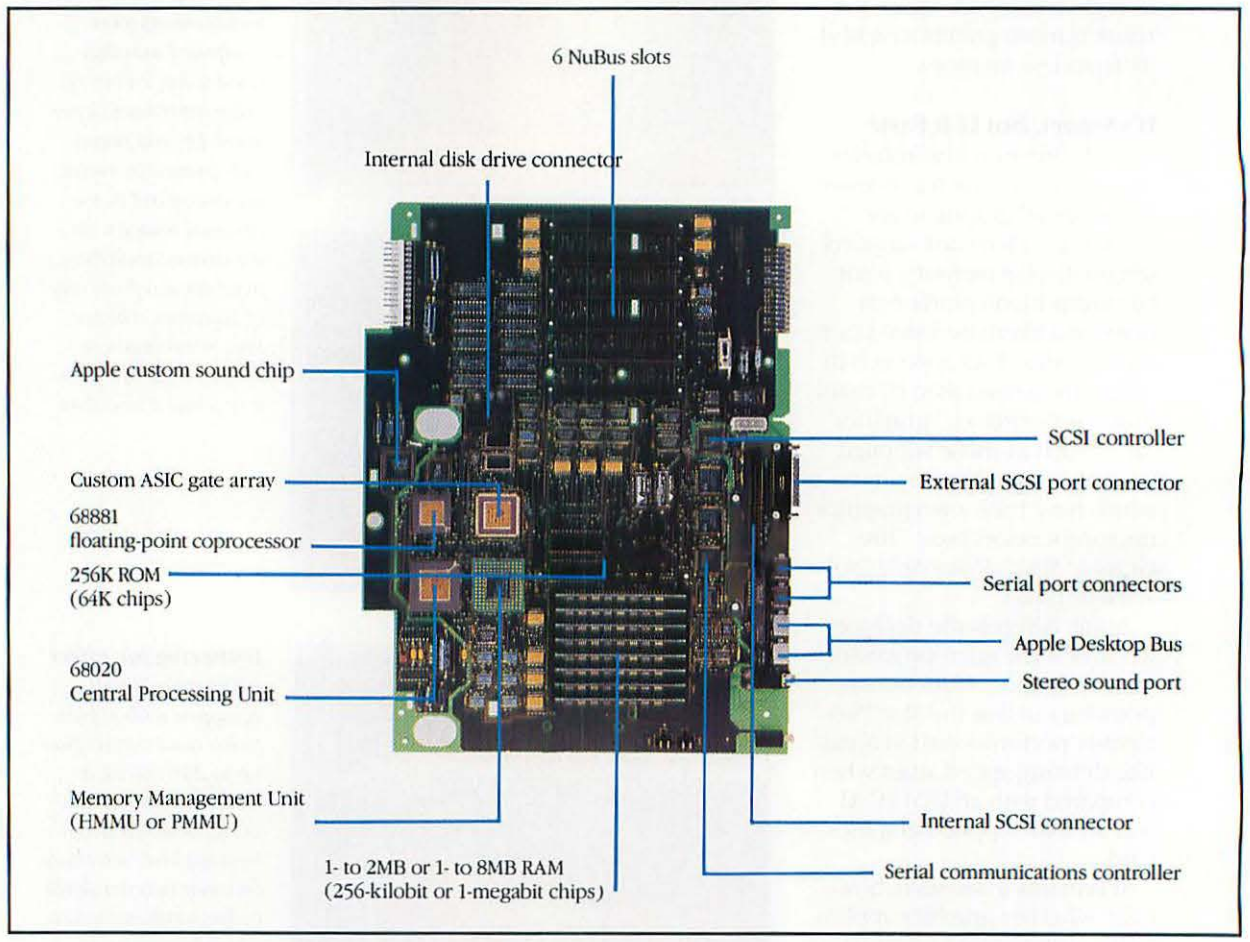
SCSI Inside and Out

Apple has not forsaken the SCSI port it introduced on the Mac Plus. In fact, Apple engineers claim that the SCSI port, still the primary connection for peripherals like hard disks and tape drives, now transfers information about three times faster than the Plus's SCSI port. The Mac II's SCSI port reportedly transfers over 1MB per second; the Mac Plus transfers only 320K per second. The major difference is the addition of hardware handshaking. Whereas earlier SCSI implementations required the CPU to access the SCSI controller continually when transferring blocks of data to and from a SCSI disk, the Mac II's implementation synchronizes the CPU with the SCSI controller. During what are called blind reads or blind writes, (operations that quickly transfer blocks of data between the Mac's memory and a SCSI disk drive), the CPU accesses the SCSI controller only when the chip is ready to transfer data, thereby avoiding unnecessary CPU activity.

The Mac II's internal hard disk drive attaches to an internal SCSI connector. You can also connect up to six more SCSI peripherals via the SCSI connector on the back panel. The floppy drives connect internally to two disk drive connectors; however, because the connectors are not brought out to the rear panel of the machine, you can no longer attach external floppy drives.

The Integrated Woz Machine (IWM)

Mac II Motherboard
At the heart of the Macintosh II is the motherboard, which contains the CPU and the memory chips. You can expand the system by adding cards via the six NuBus slots (top) or adding RAM via the SIMM slots (bottom).



used in earlier machines still controls the built-in floppy drives. But the revised IWM will be able to read 1.6MB floppies when 1.6MB drives become available.

Peripheral Expansion and Networking

In adding new features to the Mac II, Apple hasn't broken with the Mac's peripheral past. The Mac II still offers the same modem and printer ports for connecting existing serial devices. The only change to the two ports is the addition of a new signal on a previously unused pin. The signal can be used on either port to receive a modem's carrier-detect input, or on the modem port as an external clock signal from a synchronous modem.

The Mac II's AppleTalk implementaton has not changed beyond the addition of several new AppleTalk protocols in ROM. According to Apple engineers, the Mac II is compatible with existing AppleTalk hardware and software.

Since the AppleTalk protocol is not tied to the Mac's serial port—the serial port, or physical layer, is independent of the message-passing and connection-oriented protocols of higher layers—AppleTalk programs will be able to take advantage of other AppleTalk devices attached to the NuBus.

By plugging a network card into the NuBus, you will be able to replace AppleTalk's physical layer with a higher-performance layer like Ethernet. Doing so will allow AppleTalk software to take advantage of Ethernet's 10-megabit-per-second transfer rate. AppleTalk normally transfers only 230.4 kilobits per second. The implications will be important, particularly for college and university environments or office-networked machines where, because of the number of networked machines and the heavy communications traffic, users demand a higher throughput than the Mac's built-in printer port can provide. Also, equipped with a communications board, the Mac II can act as a bridge between a local AppleTalk network and a larger, area-wide network like Ethernet or IBM's Token-Ring network.

Dueling Keyboards

The Mac II now offers a choice of two keyboards, both of which connect to the Mac via the Apple Desktop Bus (ADB) introduced with the Apple IIGS. You can choose from the standard 81-key unit, which resembles the Apple IIGS keyboard, or an expanded 105-key unit, which includes 15 function keys, a 10-key numeric keypad, and a T-shaped cursor pad.

The ADB, a low-speed serial communications bus, lets you connect up to 16 devices to the Mac II. Currently only the Mac II's keyboard and mouse attach to the ADB, but you can just as easily attach other devices: graphics tablets, trackballs, and speech input devices, for example. Any devices that attach to the Mac II's ADB should work with the Apple IIGS.

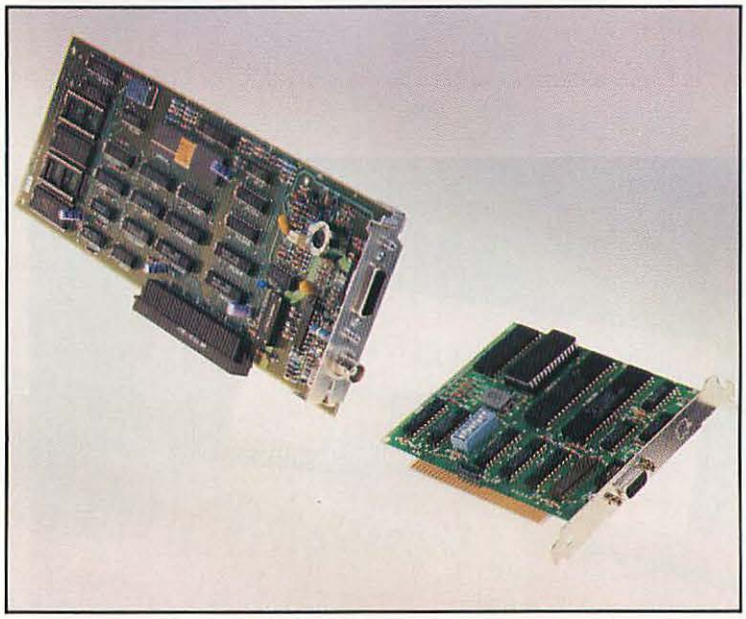
Images that had been digitized on a color scanner were displayed with incredible clarity.

Both the keyboard and the mouse attach to the ADB connectors at the rear of the machine. Alternatively, the mouse can plug into the keyboard. Each device that connects to the ADB has its own microprocessor so that it can send and receive messages to and from the Mac II's CPU.

Music to Compute By

Although the Mac II can't match the 16-voice harmony of the Apple IIGS, it plays a fairly mean tune with its four built-in voices. The Mac II's sound capabilities are based on a custom sound chip designed by Apple's engineers. The Apple Sound Chip (ASC) contains two 1K sound buffers that allow sounds to be played independently of the Mac II's CPU. The ASC feeds two Sony sound chips that handle the filtering and amplification. If you listen through headphones or attach a stereo amplifier or external speakers, you get an unusually clean stereo sound.

The key to controlling the Mac II's sound is a Toolbox routine called Sound Manager. Just as QuickDraw contains drawing commands that insulate the application program from the graphics hardware, so the Sound Manager insulates sound applications from the sound hardware. Programs that use the Sound Manager will be able to take advantage of NuBus sound cards with no modifications. In fact, musicians and audiophiles will undoubtedly add advanced-function sound boards to give the Mac II professional-quality sound capabilities.



Network Options
For the first time, Mac users will be able to plug in an Ethernet card (left) to send AppleTalk messages over Ethernet. IBM PC users can connect to AppleTalk via Ethernet or the AppleTalk PC card (right).

The Sound Manager controls four types of sounds, produced with the built-in sound synthesizers. Note synthesizers can play a melody made up of single notes. Wave Table synthesizers play more complex sounds based on a sound stored in a wave table. MIDI synthesizers allow the Mac II to control a musical synthesizer through a MIDI adapter connected to either of the Mac II's serial ports. Finally, the Sampled Sound synthesizer can play prerecorded sounds stored in sound files on the disk. Unlike previous Macs, the Mac II can play a sound continuously from a sound file stored on disk while the CPU runs another application.

Mapping Out Memory

The Mac II's CPU can address 256 times more memory than the CPU in previous Macs. The 68020, with its 32 address lines, directly addresses up to 4 gigabytes (4,294,967,304 bytes). The 68000 used in the previous Macs has only 24 address lines and addresses only 16MB.

The Mac II accommodates two addressing schemes. When you run the Macintosh system software, the Mac II runs as if the 68020 were sending out 24-bit addresses. When you run the UNIX operating system, the Mac uses all 32 bits, and programs can address the full 4 gigabytes of memory.

To allow existing programs to run on the Mac II, and new system software, such as UNIX, to utilize the larger memory space, the Mac II will accept one of two memory-management chips: the H-Memory Management Unit (HMMU) or the Paged-Memory Management Unit (PMMU).

The HMMU or PMMU sits between the CPU and the rest of the Mac II's internal bus (see "Looking Inside the Mac II"). It translates the addresses from the CPU, which are called logical addresses, into 32-bit physical addresses. The Mac II's main memory, the NuBus, and peripheral controllers like the SCSI and the disk port look at the physical address. Therefore, it is the Memory Management Unit, not the application program, that controls actual access to the physical portions of the Mac II's hardware.

If you're going to run the Macintosh system software, you'll install the HMMU in the base unit. The HMMU translates the lower 24 bits of the 68020's addresses into 32-bit addresses that correspond to the standard Macintosh memory areas (see "Mapping the New to the Old"). Software can also direct the HMMU to pass all 32 bits onto the Mac II's internal bus.

The PMMU operates in either a 24-bit or a 32-bit address mode, so that the Mac II can run Macintosh system software as well as UNIX. If you are going to run the UNIX operating system, you must install the PMMU. Because UNIX divides memory into separate areas called pages, many of which may reside on a hard disk, it requires the PMMU to translate the logical addresses from the CPU into physical memory addresses, which correspond to individual pages. Pages that are not in physical memory are loaded into RAM from disk as needed. Future multitasking software for the Macintosh system would also require the PMMU.

It is interesting to note that should the Mac's CPU ever be upgraded to the 68030, the software written for the PMMU would be compatible, since the 68030 contains the PMMU on the chip.

System Software

Despite all its new features, the Mac II doesn't abandon its software heritage. Though the Mac II comes with a new version of the System file and Finder, unless



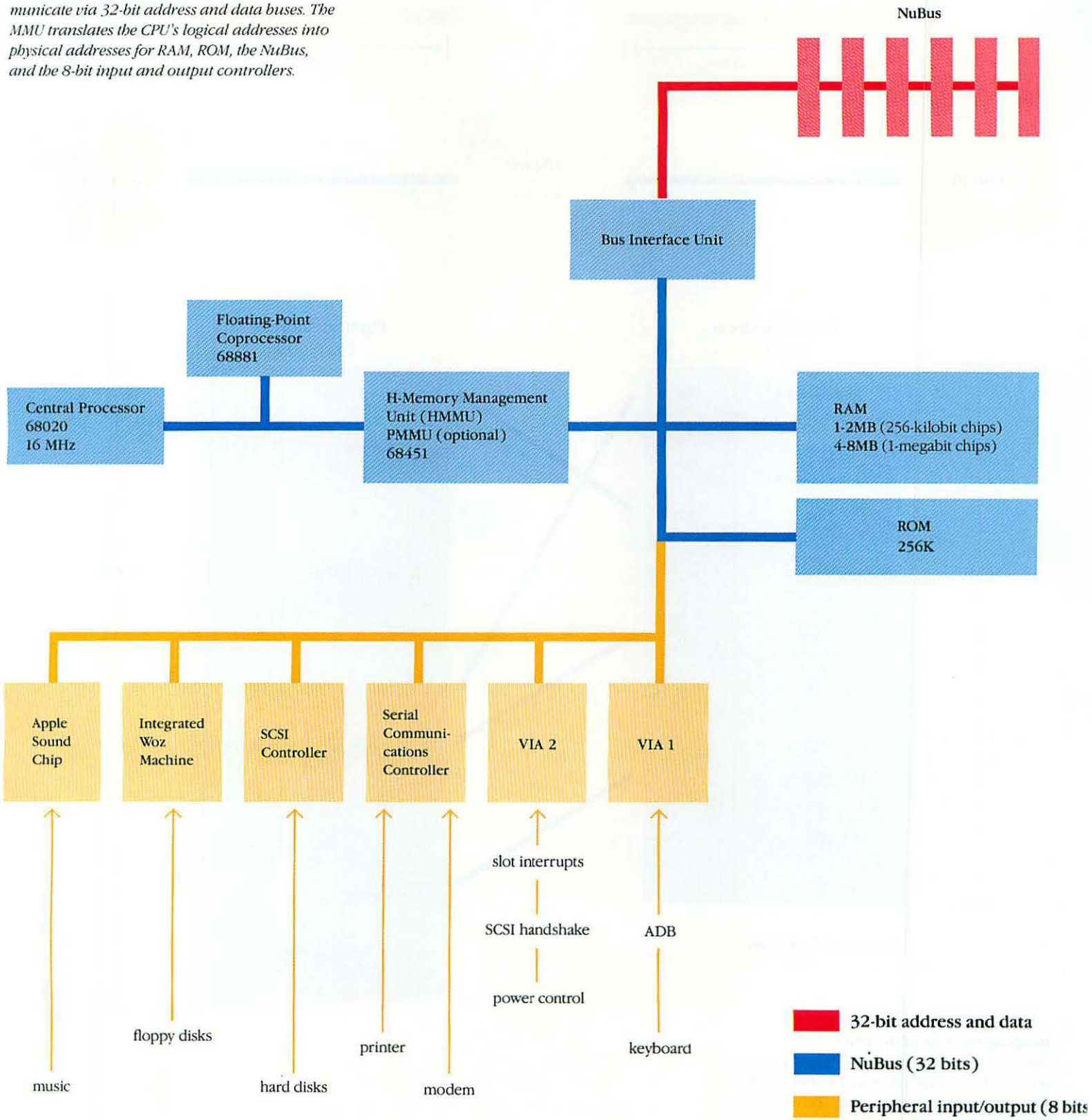
Behind the Mac II
Looking at the rear panel you see (left to right) the power switch, sound port, Apple Desktop Bus connectors, printer port, modem port, external SCSI port, openings for six NuBus cards, and AC power connectors.

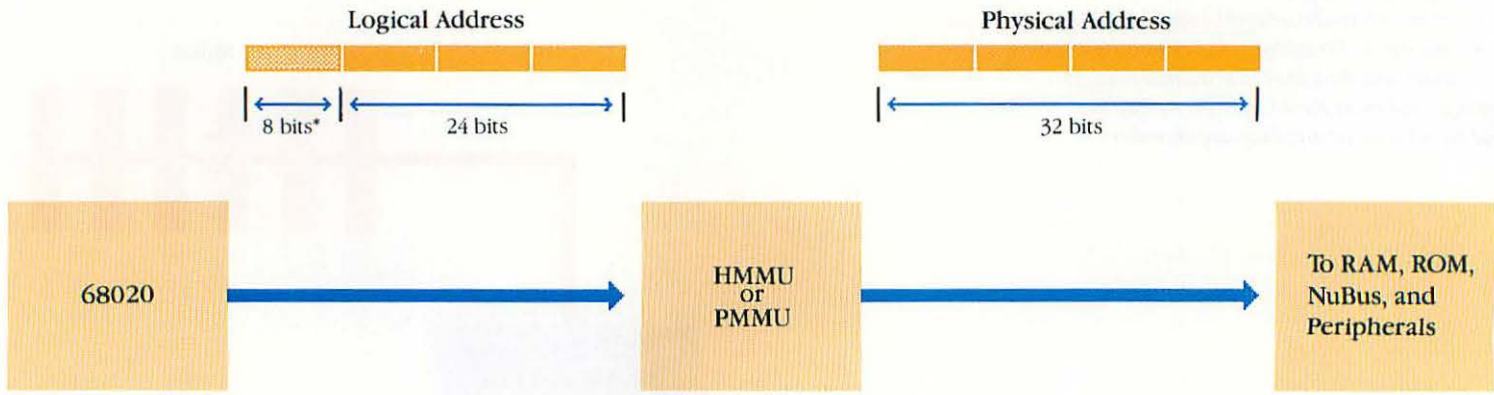


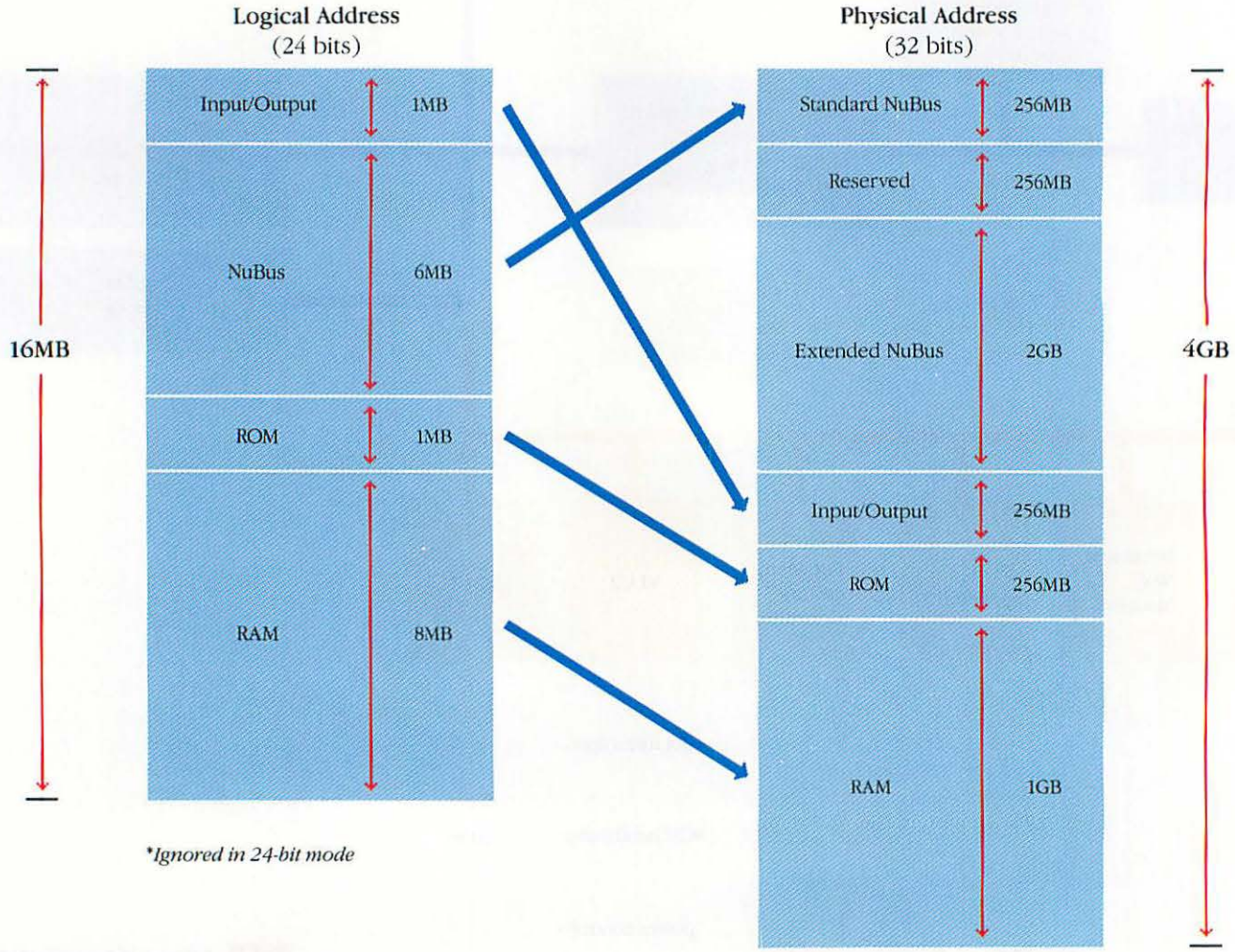
Dueling Keyboards
The 81-key Eastwood keyboard (front) has the power switch on top and a 10-key numeric keypad. The 105-key Saratoga keyboard also features 15 function keys and a separate cursor-control keypad.

Looking inside the Mac II

The 68020 CPU and the 68881 coprocessor communicate via 32-bit address and data buses. The MMU translates the CPU's logical addresses into physical addresses for RAM, ROM, the NuBus, and the 8-bit input and output controllers.







*Ignored in 24-bit mode

Mapping the New to the Old

The HMMU or PMMU maps the 24-bit logical addresses into 32-bit physical addresses when the Mac system software is running. This allows existing Mac software to use the 4-gigabyte address space of the Mac II.

you run the machine in 32-bit address mode, it still runs most of the existing Mac software.

The key to the Mac II's compatibility with its predecessors is, of course, the Toolbox—routines stored in ROM. The Mac II now contains 256K of ROM space, twice as much as the Mac Plus has.

The Mac II's Toolbox contains all the routines the previous 128K ROM contained plus provisions for coloring Mac applications and managing devices that reside in the NuBus slots. In addition to a color QuickDraw, the ROM contains new versions of

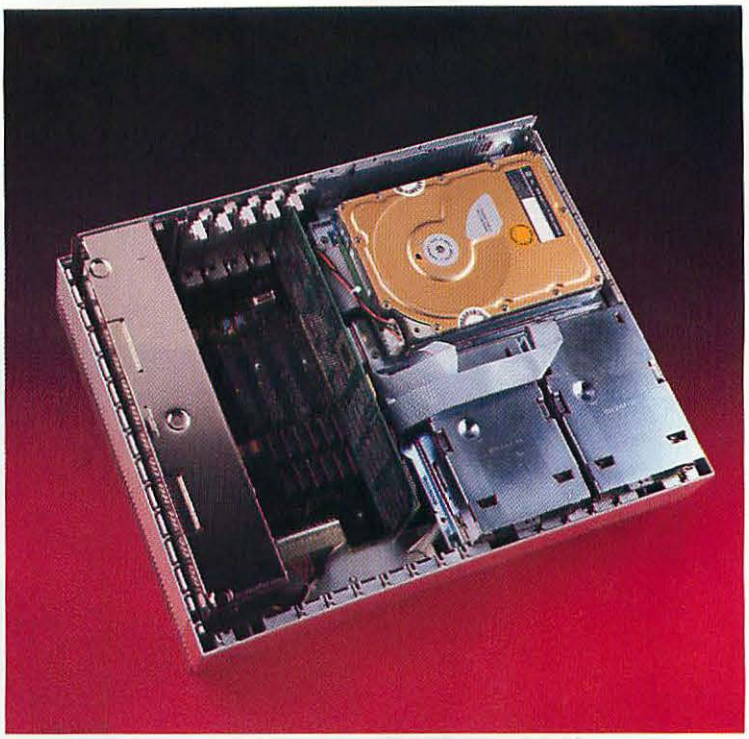
- Control Manager, which lets programs use colored dialog boxes and other controls;
- Window Manager, which allows applications to display color windows;
- Menu Manager, which can add color to menus; and
- Text Edit, which lets applications incorporate colored fonts.

To manage the NuBus cards properly, the ROM now contains a new Start Manager and a Slot Manager; even the Device Manager has undergone changes. When you first turn the machine on, the Start Manager tests the Mac II's hardware, then looks for the start-up device. You select the start-up device, a NuBus card or disk drive, from the Control Panel. The Slot Manager uses the Device Manager to read in the resources stored on the NuBus card's configuration ROM. This may be a driver or start-up code. Additionally, the Device Manager can route information to a NuBus card.

Developers can take the machine in a thousand different directions.

The Standard Apple Numerics Environment (SANE), also in the ROM, has been completely rewritten for the 68881 coprocessor and is ten times faster than previous versions. Math operations that previously relied upon SANE routines now are routed to the math coprocessor. Programs compiled with tools like Apple's MPW assembler and Pascal, Consulair's 68020 C compiler, or Absoft's 68020 Fortran run even faster, since they access the 68881 directly (see "New Ways to a Faster Mac," *Macworld,* August 1986).

The Mac II's ROM also contains code for the AppleTalk, Session, and Echo protocols, as well as the recently defined AppleTalk Filing Protocol. The routines for the ADB also reside in the ROM. Whatever space is left is filled with foreign-language fonts and other resources, depending on the localized version of the machine shipped.



Under the Hood
Lifting the top off the Mac II reveals its internal disk drives (shown here with the optional second floppy drive and hard disk installed). You install the NuBus cards in the slots to the left of the disk drives. The power supply is located on the far left.

One to Grow On

Continuity has been the hallmark of the most successful computers. Mainframes like IBM's System 370, as well as personal computers like the IBM PC and the Apple II, owe their longevity to their ties with a series of machines that offered users a range of performance options without abandoning the growing base of existing software.

The Macintosh II now gives the Macintosh user room to grow. Mac Plus and Mac SE owners looking for a higher-performance alternative will no doubt turn to the Mac II. And they can do so without sacrificing their existing software.

The Macintosh II will appeal to users needing more power than previous models can offer. Graphic designers will benefit from the Mac II's color and improved displays. Scientists, engineers, and business users will revel in the Mac II's processing power and expansive memory.

The one feature the Mac II doesn't offer is the ability to run more than one application simultaneously while using the current Macintosh system software. By adding intelligent NuBus cards, however, you may be able to download files from another computer or print a document in the background. And although UNIX provides a multiuser and multitasking environment of its own, currently you can't run Mac applications under UNIX.

Perhaps the most significant addition to the Mac II is the NuBus. Because Apple finally opened up the machine, developers can take it in a thousand directions, something that Apple alone could not do. The NuBus's simple yet powerful approach to coprocessing will pave the way for much more powerful and complex add-on products. The beauty of it all is that any added complexity will be hidden behind the familiar Macintosh interface. □

For details about new Apple products, see your local Apple dealer.



The Mac's New Face
The Macintosh SE measures 13.6 inches high, 9.6 inches wide, and 10.9 inches deep. It weighs 17 to 21 pounds, depending on which disk drives are installed internally.

PHOTOGRAPHS BY FRED STIMSON

More than a Plus



Apple redesigns the Plus and adds expandability and a hard disk to its mainstay

by Lon Poole

At first glance, the Macintosh SE looks like a restyled Mac Plus. Both machines have the same compact footprint, are light enough to be carried from place to place, and have an integrated floppy disk drive and a 9-inch black-and-white display screen (see "The Mac's New Face"). A closer look reveals some substantial differences between the two machines. The Macintosh SE has space for a second internal disk drive, no battery compartment, a repositioned power socket, an access door on the back panel, and Apple Desktop Bus (ADB) connectors for keyboard and mouse. All these new features are symptoms of major interior design changes.

In fact, the only elements the Macintosh SE and the Mac Plus have in common are the display screen and the 800K internal floppy disk drive. The logic circuits, analog circuits, and power supply are all new (see "The SE Revealed"). In addition, the Macintosh SE uses the new 85-keyswitch or 105-keyswitch ADB keyboard and the ADB mouse.

Microprocessor and Memory

One vital component retained from the Mac Plus is the MC68000 microprocessor, still running at the same 7.8336-megahertz clock frequency. The Macintosh SE logic board, like its Mac Plus counterpart, has no socket for a 68881 numerics coprocessor.

A standard Macintosh SE has 1 megabyte of RAM on four Mac Plus-style SIMMs (Single In-line Memory Modules). Dealers and stouthearted users can increase Macintosh SE or Mac Plus RAM capacity to 2-, 2.5-, or 4MB by snapping out standard SIMMs and snapping in high-capacity SIMMs, such as those in Apple's 2MB memory upgrade kit (see "Macintosh SE Memory Configuration"). SIMMs must be removed or replaced in pairs on both the Macintosh SE and the Mac Plus.

ROM capacity is 256K on a Macintosh SE, twice that of a Mac Plus. The Macintosh Toolbox (the programming that implements graphic user-interface ob-

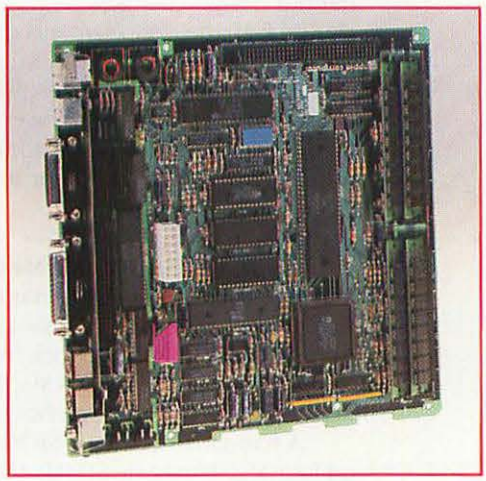


Behind the SE
The back panel of the Mac SE includes (from left to right) the Apple Desktop Bus connectors, the external disk drive port, the SCSI port, the printer port, the modem port, and the speaker jack. The cutout at the upper left can be removed to mount connectors from internal plug-in boards.

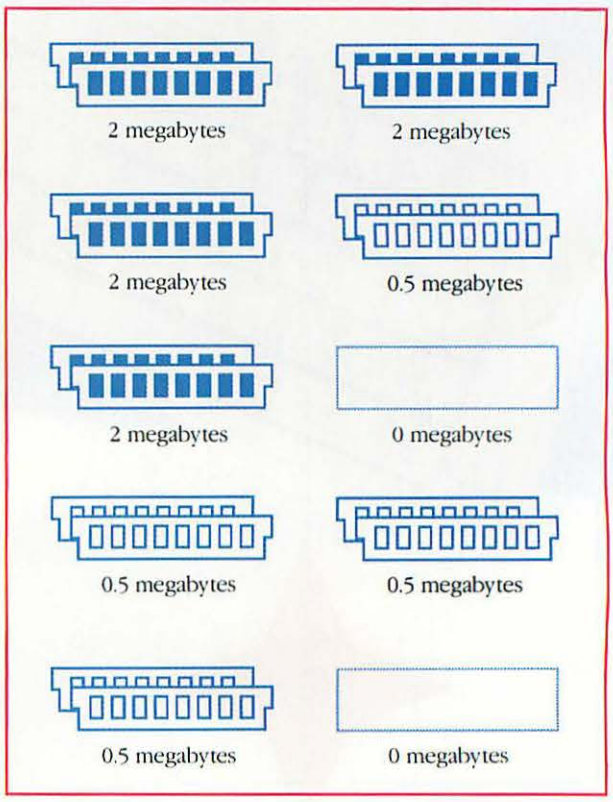


The SE Revealed
A look inside a Macintosh SE shows it has an all-new logic board, analog board, and power supply. Only the picture tube and the floppy disk drive are the same as those on a Mac Plus.





Two Ways to Expand
You can expand the Mac SE by adding memory via SIMMs (left) or by connecting an internally mounted board to the SE's 96-pin expansion connector (shown at the top right of the SE's motherboard).



Macintosh SE Memory Configuration
The Macintosh SE has two banks of two SIMMs on the main logic board. Each bank may have 0-, 0.5-, or 2MB.

jects such as windows, fonts, and menus) occupies about 160K. The fate of the remaining 96K hadn't been decided when this article was written. The extra memory may be used for international resources such as fonts for language localization. The Japanese Mac's Kanji font, for example, requires 90K.

Connections

On the back panel of a Macintosh SE are two RS-422/RS-232 serial ports, a disk drive port, a SCSI port, and a speaker jack, all like the ones on a Mac Plus. Two ADB connectors on the back panel replace the Mac Plus mouse port and the keyboard jack. In addition, the Macintosh SE has a second internal floppy disk drive connector and an internal SCSI connector to accommodate a second internal disk drive.

The SCSI interface on the Macintosh SE transfers data 1.75 to 2 times faster than the one on the Mac Plus. A number of factors contribute to the speedup. For one, the SCSI driver program in the Macintosh SE ROM has been rewritten for speed instead of space considerations. Also, the SCSI controller hardware now provides a working hardware handshake that permits graceful recovery in the event of an error at the maximum data-transfer rate. Additionally, more microprocessor time is now available for nonvideo tasks. The microprocessor spends half its time on video tasks with a Mac Plus but only one quarter with a Macintosh II. The increased efficiency arises from circuit redesign and parts consolidation. A new VLSI (Very Large Scale Integration) ASIC (Application Specific In-

tegrated Circuit) chip in the Macintosh SE, called a *gate array,* replaces 19 chips in the Mac Plus and makes the difference.

The Macintosh SE has another important feature that the Mac Plus doesn't, namely, an internal 96-pin connector that gives expansion card developers direct access to the 68000. This connector makes it easy to install an accelerator card with a numerics coprocessor or even a card containing the faster 68020 microprocessor used in the Macintosh II.

Card developers also plan to market other types of expansion cards, such as internal modems, external video, and MS-DOS coprocessors (see "Filling the Slots" in this issue). Expansion cards that require outside connections can pass cables or mount sockets in an access door on the back panel. Installing expansion cards on the 96-pin connector does not void the Apple warranty or AppleCare maintenance contract.

Power Supply

An expansion card and an internal disk drive both require power, so the Macintosh SE has a newly designed 80-watt power supply. It works on 120 or 240 volts AC from 47 to 63 Hz. Unfortunately, it generates enough heat to require forced-air cooling from a thermostatically controlled, variable-speed fan.

A lithium battery on the main Macintosh SE logic board keeps the SE clock and parameter memory alive for about seven years.

Disk Drives

Every Macintosh SE has at least one internal drive that handles 3½-inch 800K floppy disks and also has room for a second internal disk drive—either another floppy or a 20MB SCSI hard disk drive. Note that the Macintosh SE is the only Macintosh that can have three floppy disk drives—two internal and one external.

The floppy disk controller, called the IWM (Integrated Woz Machine), is clocked at twice the Mac Plus speed (now 16 MHz), to accommodate higher-capacity (1.6MB) floppy disk drives in the future. Furthermore, the IWM is socketed to facilitate future changes.

Performance and Compatibility

We couldn't spend much time with a Macintosh SE, so a complete performance evaluation will have to wait for a formal review. The Macintosh SE seems to be perceptibly faster than a Mac Plus, but not by an order of magnitude. Several benchmark programs corroborate this impression (see Figure 1 in "Macintosh II: Opening to the Future"). Apple claims its tests show that the Macintosh SE is 97 percent compatible with Mac Plus software. None of the applications we tried failed. We successfully ran *WriteNow for Macintosh, Microsoft Excel, Microsoft Flight Simulator,* and *MacWrite* 4.5, though we didn't have time to use any of the applications extensively.



Macintosh SE Team—I
The SE's designers: (back row, from left to right) Dave Fung, George Norman, Dennis Grime, Wayne Loofbourrow, Will Stein, Scott Douglass; (front) Bob Bailey, Donn Denman, and Ed Tecot.



Macintosh SE Team—II
The SE's designers: (back row, from left to right) Steve Horowitz, Frank Leahy, Steve Flowers; (middle) Jay Patel, Margie Kaptanoglu, Gene Pope, Brian McGhie; (front) Tony Leung, Erich Ringewald, Sheila Brady.

Expansion Is Only a Card Away

The Macintosh SE fits in the Macintosh family above the Mac Plus and below the Macintosh II. The Macintosh SE will disappoint those who expected a faster processor and color graphics in the familiar Mac Plus cabinet. But the SE's second internal disk drive and expansion slot should satisfy those who wanted flexibility more than flash. A faster processor, MS-DOS compatibility, a numerics coprocessor, a built-in modem, an Ethernet connection, or a large black-and-white screen are now only an expansion card away. Expansion is limited, however, to one or two functions on a single card, because the Mac SE has only one expansion slot. Still, that one slot along with the space for an internal hard disk drive makes the SE a great deal more flexible than the Mac Plus. It should open lots of doors that have been closed to the Macintosh until now. □

For details about new Apple products, see your local Apple dealer.

An Open Forum

Apple brings color and power to the Macintosh line with a host of offerings

by Lon Poole

The wait is over. After months of speculation and anticipation, Apple has announced two machines and over 25 new products that it hopes will propel the Macintosh family into the forefront of the personal workstation market. The new machines have filled out the Macintosh line, which now offers a broad spectrum of performance and features while maintaining compatibility with existing Macintosh software.

The big news is the Macintosh II, a machine that combines color with expansion slots. There's also a completely reworked version of the Mac Plus called the Macintosh SE. Apple will simultaneously ship 15 localized versions of the Macintosh SE and the Macintosh II with interfaces and documentation in ten languages: English, French, German, Spanish, Flemish, Norwegian, Japanese, Dutch, Swedish, and Italian.

To support the two new computers and the unchanged Mac Plus and Mac 512K Enhanced, Apple is introducing seven new disk drives, a tape drive, two display screens and a video adapter, two new keyboards, three memory upgrades, and upgrades of the System file and the Finder. Several other new products provide varying levels of compatibility with the MS-DOS operating system. Apple also says it will sell and support a non-Macintosh operating system, UNIX, for the Macintosh II.



PHOTOGRAPHS BY FRED STIMSON

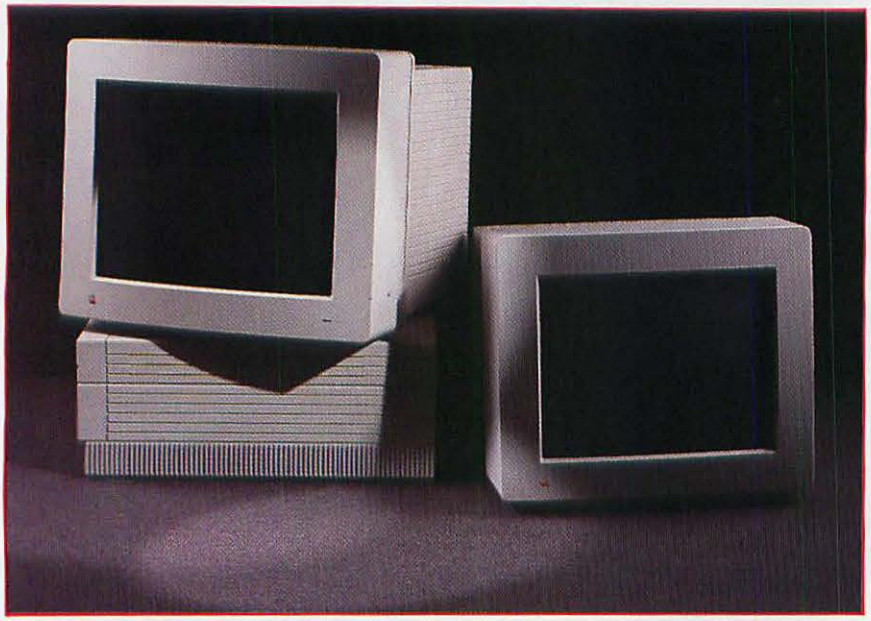


Macintosh SE

The Macintosh SE retains the familiar integrated configuration of the Mac Plus but has new styling and completely redesigned electronics. It uses the Motorola 68000 microprocessor, comes with 1 megabyte of RAM and 256K of ROM, and has a universal power supply. Inside the machine are a single expansion slot and sockets for two internal floppy disk drives or one internal floppy and an internal 20-megabyte SCSI hard disk. External connections are the same as the Mac Plus's, except that the keyboard and mouse now attach to the Apple Desktop Bus (ADB), a simple serial communications bus originally introduced on the Apple IIGS (see "More than a Plus" in this issue).

Macintosh II

The Macintosh II features more expandability, speed, and sound than any other Macintosh model and breaks new ground by offering color. The system unit houses a Motorola 68020 microprocessor, an optional 68881 numerics coprocessor, an optional 68851 memory manager, 1 to 8 megabytes of RAM, 256K to 512K of ROM, and a universal power supply. A custom digital sound chip provides 4-voice stereo sound through a small internal speaker, external "Walkman"-style stereo headphones, or an external amplifier and speakers. There's room inside the system unit for one or two internal floppy disk drives, a 20- to 80-megabyte SCSI hard disk drive, and six expansion cards. Expansion cards use the NuBus archi-



Monitors on Display
Two monitors for the Mac II. The 13-inch color RGB monitor (left) displays 69 dots per inch. The 12-inch monochrome monitor (right) displays 76 dots per inch.

tecture, a standard developed by Texas Instruments, MIT, Apple, and others. The back panel has two serial ports like those on the Mac Plus, a SCSI port, and two ADB ports for mouse and keyboard. There is no external floppy disk port.

Since the Macintosh II does not feature built-in video, at least one expansion slot must be used for a video card. Apple offers a multipurpose video card, a black-and-white monitor, a color monitor, and a universal monitor stand. The video card fits in any slot and provides 640 by 480 resolution in black-and-white or color. In its standard configuration the card displays 1 or 16 colors or shades of gray from a palette of 16.8 million. With the video memory expansion kit installed, 1, 16, or 256 colors or shades of gray are available concurrently. Apple's black-and-white monitor has a 12-inch screen and displays 76 dots per inch. The color monitor has a 13-inch screen and displays 69 dots per inch on a Sony Trinitron picture tube.

Keyboards

Apple offers a choice of two keyboards with both the Macintosh SE and the Macintosh II. Users who plan to run only regular Macintosh software will probably want the smaller, 81-key keyboard, which is similar to the Mac Plus keyboard and has exactly the same layout as the Apple IIGS keyboard. Those who plan to use a non-Macintosh operating system such as UNIX or MS-DOS, or to communicate with mainframes or minicomputers, will probably opt for the larger 105-key keyboard. It has function keys, a numeric keypad, and a separate T-shaped cursor control pad. The new keyboards cannot be used on a Mac Plus or 512K Enhanced.

The new keyboards connect to the Mac SE or Mac II via the ADB. The ADB is a simple local area network used for connecting the computer to up to 16 low-speed devices such as a keyboard, a mouse, a graphics tablet, and a bar-code reader. Each device may be connected directly to an ADB socket on the computer or daisy-chained to another ADB device.

Upgrades

Apple has always tried to provide an upgrade path when bringing out a new model of an existing computer, but clearly there is no way to upgrade a Macintosh to a Macintosh II. And while it may seem a Mac Plus could be upgraded to Macintosh SE, that is also impossible. The Macintosh SE's interior components are so different that only the screen, disk drive, and SIMMs from a Plus could be reused. Everything else would have to be replaced, even the case. Therefore "upgrading" to a Macintosh SE or Macintosh II means selling your existing Mac and buying the complete new model.

If you do trade up, chances are good that your application programs and peripherals will work on your new Mac. Apple has tried hard to make every member of the Macintosh family fully compatible with earlier versions of the Mac. Of course, third-party software and hardware are more likely to work, especially on a Macintosh II, if they follow Apple's guidelines. Not all manufacturers follow the rules, however, so expect a period of adjustment while they update their products to work with the new machines.

Disk and Tape Drives

During the last year, third-party developers have shipped more than three dozen different disk drives and tape drives for the Macintosh. Now Apple joins the free-for-all with seven more disk drives and a tape drive of its own. You can get a second internal 800K floppy disk drive from Apple for either the Macintosh SE or the Macintosh II.

Internal SCSI hard disks include a 20-megabyte model for the Macintosh SE or the Macintosh II, and 40- and 80-megabyte models for the Macintosh II. In addition, Apple now offers 40- and 80-megabyte external SCSI hard disk drives. These and the Apple HD-20SC, introduced last fall, work with any Mac that has a SCSI port.

For hard disk backup, you can use Apple's 40-megabyte SCSI tape drive. The removable tape cartridges are also convenient for transporting as well as distributing multiple megabytes of information.

MS-DOS Compatibility

More than a year ago, Apple president John Sculley announced Apple's intention to provide IBM PC and MS-DOS compatibility for the Macintosh. Apple and third parties have now announced several products designed to make that compatibility a reality. The elements necessary for sharing files, disks, and printers

among MS-DOS and Macintosh machines over local area networks have been available from third parties for some time. Apple has now added its long-awaited AppleTalk card for IBM PCs.

The next level of MS-DOS compatibility is supplied by several new Apple products. A 5¼-inch floppy disk drive and controller permit direct loading and saving of MS-DOS files from the Finder or other Macintosh applications. A few Macintosh applications can directly load or save files formatted for MS-DOS applications. In addition, Apple is providing a file conversion application, *Passport*.

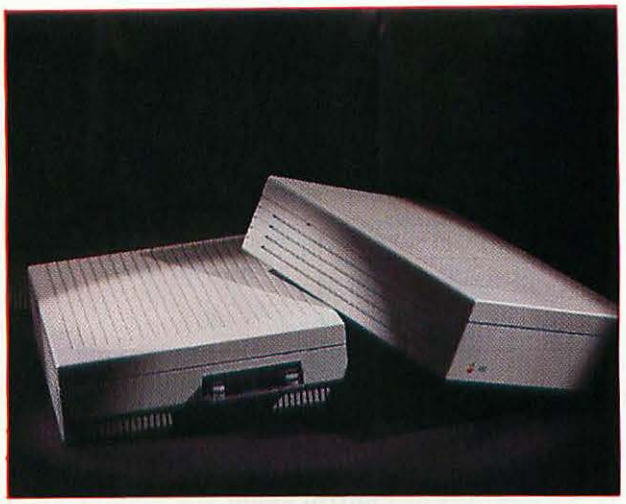
The final level of compatibility makes it possible to run MS-DOS applications on a Macintosh SE or Macintosh II. Apple supplies the keyboard and the disk drive, while third parties provide coprocessor cards and software that runs MS-DOS applications in a Macintosh window. (For more information on third-party products, see "Filling the Slots" in this issue.)

Apple also announced file transfer software for use with the Mac when it is emulating an IBM 3270 terminal, a terminal commonly used with IBM mainframe computers.

System File and ROM

The System file and ROM have been changed in order to support new hardware, improve performance, and provide new features. The Macintosh SE and Macintosh II both have 256K of ROM with similar though not identical content. Both include all the Macintosh Toolbox routines, except for the List Manager and International packages, in some of the additional memory. Some system resources have been moved from the System file to the new ROMs, including the 9- and 12-point sizes of the Geneva and Monaco fonts. The new ROMs also contain extensive interactive diagnostic tests. With these diagnostics, a repair technician can quickly and accurately troubleshoot an ailing Mac from another Mac via the serial ports. These programs use about 160K of the 256K ROMs; the remaining space is used differently on the Macintosh SE and the Macintosh II. (See "Macintosh II: Opening to the Future" in this issue for details.)

A new version of the System file is now being shipped with the Macintosh SE, and an even newer version will be distributed when the Macintosh II is shipped. The new System file may retrofit other Macintosh models with some of the Macintosh SE ROM changes. However, complete retrofitting would use significant amounts of the System Heap area of RAM, which could cause some applications to fail. At press time, Apple had not decided which ROM changes to include with the new System file. New System files should work with all Macintosh models except the 128K Mac.



Matched Pair
Apple's Tape Backup 40SC stores up to 38.5MB on a single DC2000 tape cartridge. The Apple HD-40SC can locate a track in an average of 30 milliseconds. Both drives connect to the SCSI port on a Mac Plus, a Mac SE, or a Mac II.

Toolbox Improvements

Several of the Toolbox routines in the new Macintosh ROM have been improved. Standard text editing that uses the TextEdit routines now includes style information. Text that was formerly limited to a single font, size, and style can now incorporate a variety of fonts, sizes, styles, and colors (on the Macintosh II). In addition, the Clipboard can now retain those text attributes when you cut, copy, and paste text between applications. However, applications must include some method for choosing mixed text attributes, or be revised to take advantage of this new capability; otherwise, they will still limit each text block to a single font, size, style, and color.

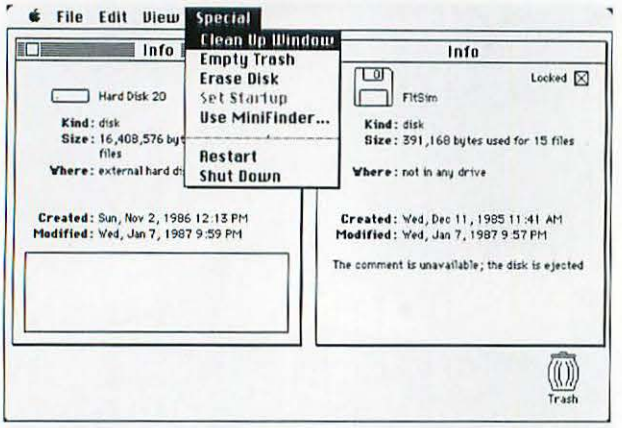
The AppleTalk local area network now has echo, session, filing, and data-stream protocols. These enhancements were announced in January along with Apple's file server.

QuickDraw has been rewritten for Macintosh II color. It adjusts itself to the screen size, number of colors available, resolution in pixels per inch, and so on, enabling applications to run regardless of the type of video card or monitor installed. The new QuickDraw supports the original QuickDraw method for specify-

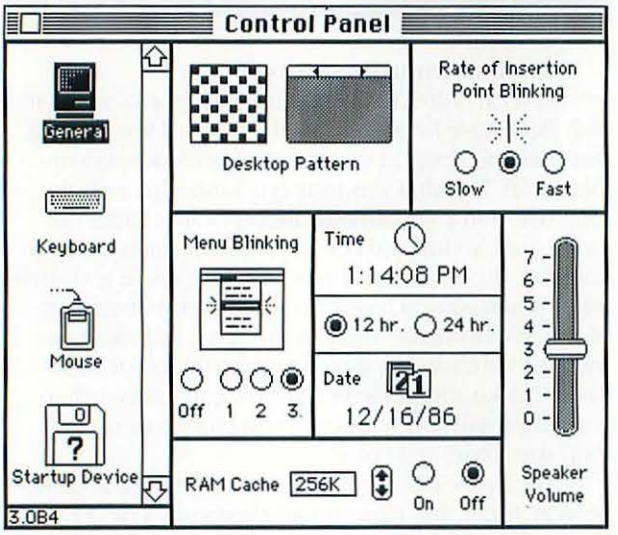


Reading MS-DOS
Apple's 5¼-inch disk drive and controller allow the Mac II to read and write MS-DOS files directly from the Finder or an application. The Passport *software will provide file conversion between different file formats.*

New Finder
The latest version of the Finder has restyled Info windows, three variations of the Clean Up command, a new Restart command, and a modified Shut Down command. The Trash icon also shows whether there's anything in the trash.



Control Panel 3.0
The latest version of the Control Panel desk accessory is modular. You choose the module whose settings you want to change by selecting an icon at the left side of the window.



ing colors and a newer method that allows more precise control over a wider range of colors. In addition, a number of Toolbox routines have been "colorized" for the Macintosh II, including TextEdit, Window Manager, Control Manager, and Menu Manager.

New Sound Manager routines give the Macintosh II four types of sound synthesizers. A Note synthesizer generates simple tones and tunes. A Wave Table synthesizer produces more complex sounds and multiple-part music. A MIDI (musical instrument digital interface) synthesizer works with external MIDI devices to create sounds. The Sampled Sound synthesizer plays prerecorded digital sounds or sounds generated by another application.

Apple's standard numerics package, SANE, has been completely rewritten and is about 10 times faster than the previous version.

The SCSI manager has been improved on both the Macintosh SE and Macintosh II. The Macintosh II also has a new Slot Manager and Memory Manager.

Finder

Many observers in the Mac community had hoped to see a new type of application launcher and file utility from Apple by now, one that would permit running more than one application concurrently (perhaps based on Andy Hertzfeld's *Servant*). But for now, Apple is only refining the familiar Finder (see "New Finder"). For multitasking, you'll have to use UNIX on the Macintosh II.

In the new Finder's Special menu, the original Shut Down command is replaced by a Reset command. A new Shut Down command helps you switch off a machine connected to a hard disk. On a Macintosh II, the Shut Down command now turns the power off. On a Macintosh SE or Plus, a dialog box appears telling you when you may safely turn the power off.

The Clean Up command in the new Finder's Special menu has three variations. You may clean up a selected group of icons, leaving other icons alone; you may clean up icons on the desktop; or you may clean up all icons in the active window, as before.

When you choose Get Info from the File menu, a redesigned information window is displayed. This command also tiles information windows so you can see two at once. And the Trash icon changes shape when you drag items into it, visually indicating that it's not empty.

Control Panel and Chooser

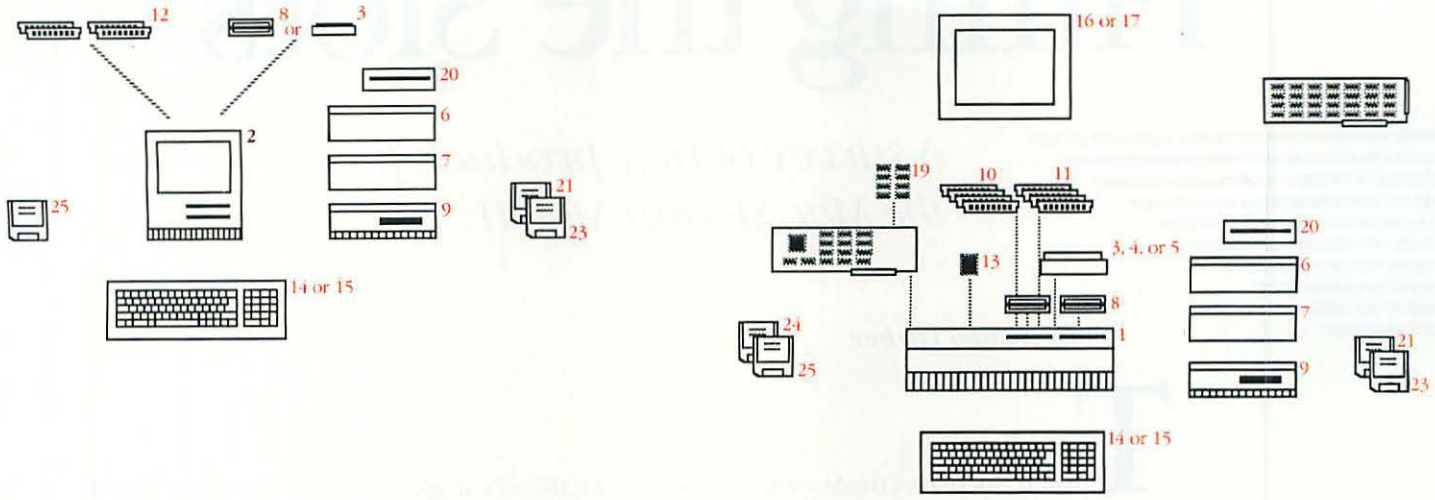
Apple has redesigned the Control Panel desk accessory. It is now modular, since some peripherals and accessory cards may have settings you can change. On a system with more than one hard disk attached, for example, you can now designate which will be the start-up disk. All settings from Control Panel version 2.0 are included except the keyboard, mouse, and AppleTalk settings (see "Control Panel 3.0"). Keyboard and mouse settings now reside in two separate modules, while AppleTalk settings have been moved to the Chooser desk accessory. The first version of the Control Panel included menu blinking, time, and date settings, all of which are in Control Panel 3.0.

A new Chooser desk accessory was introduced with the file server in January 1987. The new Chooser can handle more than six devices. If more than six devices are present, you scroll through a list of icons to select them.

The Macintosh Family

The Macintosh SE and the Macintosh II broaden the Macintosh family to provide four distinct levels of power, flexibility, and cost. At $1699, the Mac 512K Enhanced is the low-cost, entry-level machine. Another $500 buys the flexibility of a SCSI port and the power of more memory in a Mac Plus. Both of these models will continue to be available as long as there is demand for them.

The Macintosh SE is an expandable Mac Plus and will probably become the mainstream Macintosh. Prices were not final at press time, but a Macintosh SE



Computers
1. Macintosh SE
2. Macintosh II

Disk and Tape Drives
3. 20MB internal hard drive
4. 40MB internal hard drive
5. 80MB internal hard drive
6. 40MB external hard drive
7. 80MB external hard drive
8. 800K internal floppy drive
9. 40MB tape drive

Memory
10. 1MB upgrade for Macintosh II
11. 4MB upgrade for Macintosh II
12. 2MB upgrade for Macintosh SE and Plus
13. PMMU paging memory manager upgrade for Macintosh II

Keyboards
14. 81 key
15. 105 key, with function keys and "T" cursor pad

Displays
16. 12" black-and-white
17. 13" color
18. Standard Macintosh II video card: 1 or 16 colors (1 or 4 bits per pixel)
19. Video card expansion memory: 1, 16, or 256 colors (1, 4, or 8 bits per pixel)

MS-DOS Compatibility
20. 5¼" MS-DOS-compatible drive
21. Passport file-translation software
22. AppleTalk card for IBM PC
23. IBM 3270 file-transfer software

Software
24. UNIX V with most 4.2 extensions
25. System and Finder upgrade

should sell for about $2600 with one floppy disk drive and about $3600 with the addition of an internal 20-megabyte hard disk drive. Both configurations are now available.

Macintosh II is the high-performance Macintosh for demanding users and specialized applications. At press time, the expected price of the Macintosh II system unit, with 1 megabyte of RAM, a mouse, and one floppy disk drive, was about $3500. A minimal working configuration, with the standard video card and monochrome monitor, should cost $4200 to $4300. Loaded with two floppy disk drives, a 40-megabyte internal hard disk drive, an extended video card, and a color monitor, a Macintosh II will run $6000 to $7000. The Macintosh II will be available in limited quantities in April, May, and June, and in unlimited quantities thereafter.

The Macintosh family includes more than computers. Apple's current lineup of peripherals and accessories should satisfy 80 percent of users' needs for keyboards, monitors, video cards, disk drives, tape drives, MS-DOS compatibility, and memory upgrades.

Each member of the Macintosh family provides a different balance of power, flexibility, and cost. For maximum performance and flexibility where price is no concern, a Macintosh II is the clear choice. A Macintosh SE may be your best bet if you only need to expand in one direction and want to keep costs down. If you don't care about expansion but do need lots of memory applications such as page layout or database, you may not need to spend more than the price of a Mac Plus. The lowest-priced Mac, the Mac 512K Enhanced, still has plenty of power for writing, filing, drawing, and communications. No matter which Mac you pick, the Macintosh technology is the same. You get the same graphic user interface, what-you-see-is-what-you-get display, and consistency between applications on all models. □

For details about new Apple products, see your local Apple dealer.

Assembling the Pieces

With over 20 new products, putting the pieces together can be a challenge. While many of the products are centered around the Mac SE and the Mac II, some—like the SCSI storage devices and RAM SIMMs—will work with the Mac Plus.

Filling the Slots

A survey of new products for the Mac SE and Mac II

by Daniel Farber

The introduction of the Macintosh SE and the Macintosh II has developers rushing to fill the slotted gaps and other ports of entry with expansion cards and peripheral devices. Several types of cards are in various stages of development by third parties, including video display cards that allow you to hook up a variety of monitors; communications cards that provide modems, terminal emulators, or processors for supporting networks such as Ethernet; coprocessor cards that let you run MS-DOS applications on the Mac; multifunction cards with coprocessors; and memory for printer spooling and other tasks. High-capacity hard disks, display monitors, and input devices such as graphics tablets will also proliferate, along with new and revised software applications that take advantage of the Mac SE and II hardware.

The open Mac finally dispels the notion that Apple computers do not belong on the desktops of corporate America. Big business is now looking at the Macintosh family of computers as a legitimate alternative to the IBM standard. The best evidence supporting this view is the steady stream of established vendors from the IBM PC world joining the ranks of Mac developers to take advantage of the Apple's upgraded status among the Fortune 1000 companies. For example, AutoDesk, whose *AutoCAD* package dominates the IBM PC CAD market, is reportedly developing products for the new Macs. And *WordPerfect,* the most popular word processing program for the IBM PC, is being released in a version that will run on the new Macs.

The product descriptions that follow represent only the products announced at press time. As other products become available for the Mac SE and II, we'll keep you up to date.

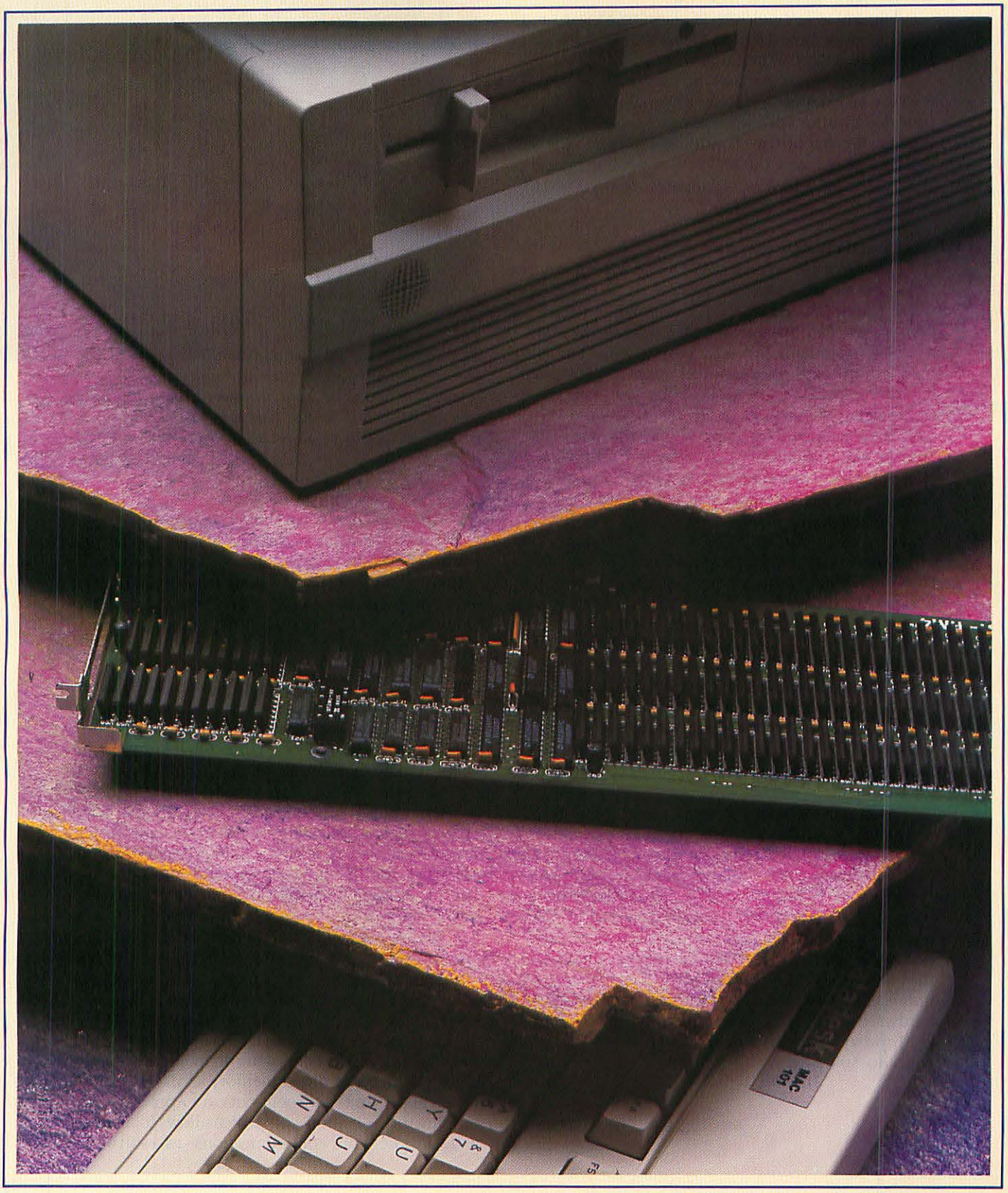
The Mac SE Enhanced

Although the Mac SE cannot use Mac II cards (unless they're connected through a NuBus expansion chassis), the machine's expansion connector supports a wide spectrum of products. Several types of boards will vie for the SE's single expansion connector. The SE begs for an upgrade to the Mac II's faster 68020 microprocessor, with options for the floating-point 68881 coprocessor. A number of companies are developing accelerator boards that connect to the system expansion connector, as desktop publishing, engineering, and graphics applications for the Mac can all benefit from the speed gained by installing an accelerator board. Developers are also adding multiple features to the boards to maximize use of the SE's single expansion connector.

AST Research, a major vendor of add-on boards for the IBM PC, has developed the MacPak, an accelerator board with a 68020, a 68881, and 1 megabyte of RAM. AST offers two options for the MacPak board. The first provides an SCC (serial communications controller) chip with two AppleTalk connectors and a floppy disk controller for a 5¼- or 3½-inch disk drive. The other option is a video-display adapter that allows you to hook up high-resolution, large-screen monitors to the SE.

Levco, the leading vendor of 68020 upgrades for the original Mac, has introduced the Levco Prime, which includes the 68020 and the 68881 with 1-, 2-, or 4MB of memory. Optional features include the 68851 coprocessor for memory management and a high-speed SCSI port with a DMA (direct memory access) controller. Levco also plans to provide an optional video-display adapter.

Radius has incorporated the Radius Full Page Display (FPD) and a high-performance 68020 on a single board. The Radius accelerator is unique in offering a high-speed data cache to supplement the on-chip instruction cache of the 32-bit 68020. The high-speed (40 nanosecond) static RAM cache allows the 68020 to run with no-wait states when accessing the cache, thus providing high performance with existing memory. The board also has an option for the 68881 coprocessor. A version of the Radius accelerator that's compati-



PHOTOGRAPHS BY PAUL FRANZ-MOORE

ble with the Mac Plus and Mac 512K Enhanced will be available to owners of those machines, and current FPD owners will receive a discount.

SuperMac Technologies is planning a 68020 and 68881 upgrade board for the SE, as well as MacMemory and Dove Computer.

Another way to expand the capabilities of the SE is to use an expansion chassis. The external device provides a NuBus and expansion slots so that you can use Mac II cards on the SE. Adding a NuBus to the SE will be an expensive but still very appealing option as an upgrade path. Several companies are expected to begin work on such a product.

MS-DOS Coprocessors

Some people consider MS-DOS compatibility critical to the Mac's success in big business. To that end, Apple commissioned Phoenix Technologies to develop coprocessor cards that let the Mac emulate the 8086 and 80286 (similar to a 6-MHz IBM AT with Hercules II monochrome and color graphics adapters) MS-DOS environments. MS-DOS applications will share all peripheral and I/O services of the Mac II, and the MS-DOS file system will be mapped onto the Mac's Hierarchical File System (HFS). Apple will probably line up an independent company with experience in the MS-DOS world to market and support the cards, but at press time a marketing decision had not yet been made.

Dayna Communications has developed an MS-DOS coprocessor that can be used with the Mac SE. Dayna's MacCharlie provided an MS-DOS environment on the original Mac. The company's new product is an IBM AT-class file server running MS-DOS that connects to AppleTalk. The unit contains an 80286 coprocessor and eight expansion slots with the full AT-style bus. The coprocessing device, which is designed to lower the cost of MS-DOS compatibility, also works with the Mac Plus and the 512K Enhanced. The company plans to support Ethernet with a future version of the product.

Although the ability to run IBM PC applications on the Mac is an important part of Apple's overall strategy, it's more political than practical. Running MS-DOS programs on the Mac will save space on the desktop, but applications like Lotus's *1-2-3* can't take advantage of the Mac's graphics and user interface. Rather than turn the Mac into a PC clone, it would be more economical to transfer *1-2-3* files into *Excel* or *Jazz* and thus also receive the benefits of the Mac interface. Programs like *TOPS, MacLink Plus,* and *PassPort,* plus hardware like 5¼-inch drives and Dayna's FT100, already provide adequate media and file-transfer compatibility solutions.



Several new hardware products provide a degree of MS-DOS compatibility. Dayna Communication's SL286, which works with the Mac SE and the Mac Plus, is an AT-class file server running MS-DOS that connects to AppleTalk.

Communications Cards

The architecture of the new Macs, especially the II, allows the Mac to be easily connected to various networks and function as a workstation, a file server, or a terminal emulator. Several companies are developing networking cards for the most prominent networks: Ethernet, StarLan, Token-Ring, TOP, and MAP. Kinetics has developed an Ethernet card for the SE that connects to the expansion connector. If you need the slot for an accelerator or video board, you can connect to the network via the company's Ether-SC, an external device that provides a direct line between the Mac's SCSI port and Ethernet networks. Lutzky Baird plans to introduce an Ethernet card for the SE, and 3Com has introduced one for the Mac II. Dove Computer also plans to develop an Ethernet card. Think Technologies is developing a Token-Ring card that runs AppleTalk, and Touch Communications is working on TOP (Technical Office Protocol) and MAP (Manufacturing Automation Protocol) for the Mac II.

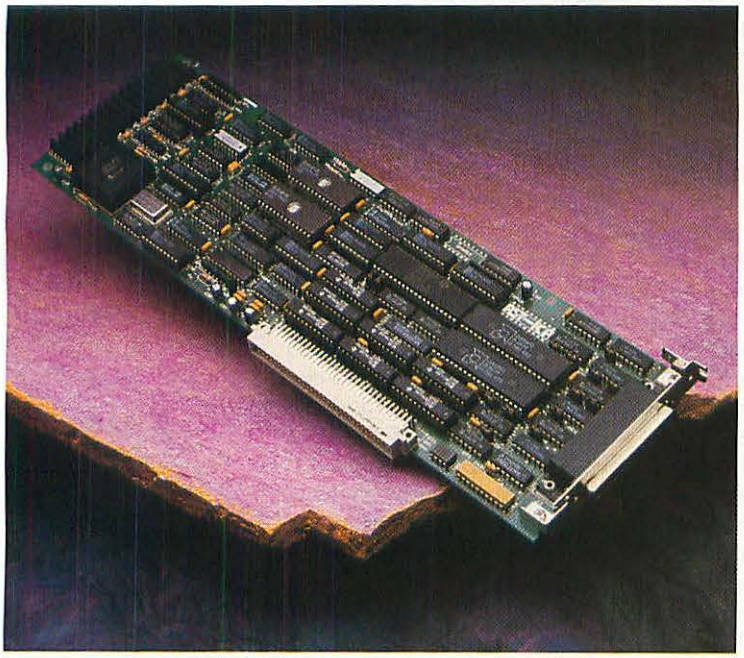
Running AppleTalk under UNIX networks on the Mac II taxes the resources of the 68020. AST has developed the ICP (Intelligent Communications Processor), which can relieve that burden. The card includes a 68000 coprocessor and a half-megabyte of RAM, and it provides four additional serial ports for the Mac II. In addition, the AST ICP lets you run multiple AppleTalk networks and uses direct memory access (DMA), which improves the throughput over AppleTalk. AST is offering the X.25 protocol—which allows local-to-wide-area network communications—as a software op-

tion. Eicon Technology is providing an AppleTalk-to-X.25 protocol on a card for the Mac II. Reach Technologies has developed an AppleTalk server card for the II. The card includes two 68000 coprocessors for handling the disk I/O and file management tasks plus up to 4MB of memory.

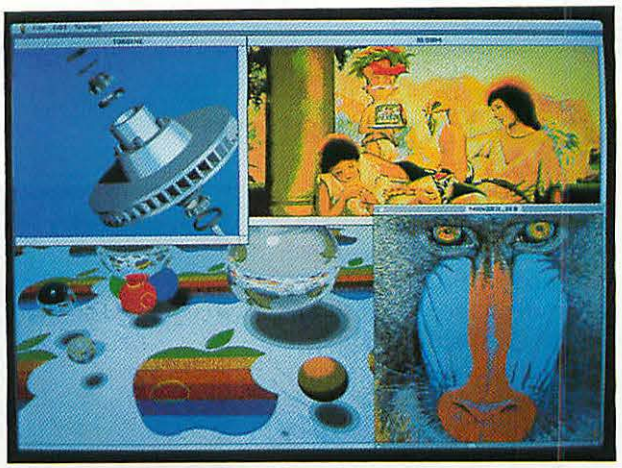
Modem cards and terminal emulators will also find a home in the Macintosh SE and II. SuperMac Technology will offer 1200-baud and 2400-baud modem cards for the two machines, and Hayes will undoubtedly develop smart modems for the new Macs. Tri-Data's Netway 1000, a gateway box for AppleTalk with 3274 and 3278 emulation, can be adapted to work on the Mac SE and to take advantage of full-screen color terminal emulation on the Mac II. In the fall AST expects to ship a 3278/5251 emulation card for the SE and the II. The 3278/5251 includes both twin axial and coaxial connections on a single card. In addition, Avatar is developing terminal emulation products for the new machines.

Memory

Most memory upgrades will be SIMM modules placed on the motherboard. Because the Mac operating system can't address more than 1MB of RAM per NuBus card, most of the RAM will exist on the motherboard. However, NuBus memory cards for UNIX will be available, especially since UNIX requires 1.5- to 2.5MB for the kernal alone on the Mac. AST, for example, offers the RM4, a 4MB memory card consisting of 256K chips, with a full 32-bit interface. When 1-megabit chips become available at reasonable prices, AST plans to upgrade the board with 8MB of SIMM memory. Laser spooling, which allows you to print in the background, is another feature that could be included on a memory card.



AST's Intelligent Communications Processor is designed to offload some of the burden of running AppleTalk under UNIX networks on the Mac II. The board contains a 68000 coprocessor, .5MB of RAM, a DMA controller, and four additional serial ports.



This image was produced on the Mac II and displayed using a prototype of SuperMac Technology's 8-bit-per-pixel video card on a 1024- by 768-dot-per-inch monitor. The company also plans to offer 1380- by 964-dot-per-inch displays for the new machines.

Video Cards and New Screens

A wide range of high-resolution, large-screen monitors will be available for the new machines. Existing large-screen monitors—the Radius FPD, E-Machines' The Big Picture, and Micrographic Images' MegaScreen—have been upgraded to work with the Mac SE. Since the SE has only one slot, the video-display hardware has been combined with the accelerator board to improve performance for graphic-intensive applications, as in the Radius accelerator board. Color capability for the SE will become an option, just as on the original Macs. Boards with graphics coprocessors for the SE will allow you to work in color on a separate monitor, similar to Computer Friends' Superchroma system.

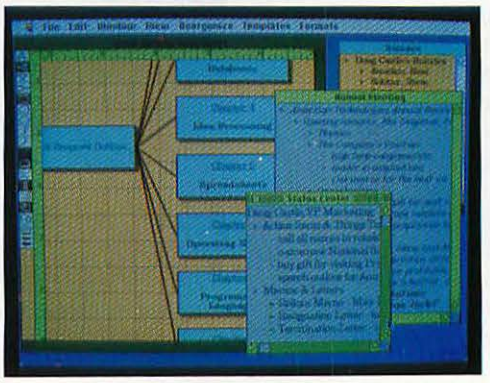
For the Mac II, SuperMac Technology is developing two color cards. One provides 480- by 640-dot-per-inch resolution with up to 8 bits per pixel, while the other provides 1024 by 768 resolution with up to 8 bits per pixel. SuperMac also has a card for high-resolution black-and-white monitors, providing from 480 by 640 to 1024 by 768 resolution (with 1 bit per pixel) for use with the Mac II or the SE. Micrographic Images is also working on a high-resolution color display card. AST is developing a video card with 640 by 480 resolution and 8 bits per pixel, similar to Apple's video card. In addition, AST will offer an 8-bit-per-pixel video digitizer, which grabs a video image and puts it into memory at high resolution. Video cards with 16-, 24-, and 32-bit planes for high-resolution color monitors are a

Great Expectations

Most software developed for the Mac Plus (and earlier versions that follow the user interface guidelines) should not only run on the SE, but should run faster on it than on the Mac Plus. Applications that run on the II or an upgraded SE will run much faster if they exploit the 68881 coprocessor. Obviously, the faster processor speed and expanded memory will improve the performance of applications and allow for more ambitious programs, such as sophisticated image-processing software and integrated, multiuser office applications. Existing products will be enhanced so that they can take advantage of the new capabilities. *Cricket Graph* and *More,* for example, have already been modified to run in color on the Mac II. New programs will be developed for the Mac, such as graphics, engineering programs, business simulations, and applications that run under UNIX.

We can expect to see new applications ported from the IBM PC environment in specialized areas such as law and real estate, as well as general applications like spreadsheets and project management. Some of the big names in the MS-DOS world will challenge the *Excels* and *Microsoft Words* of the Macintosh world, using the new Macs as a platform.

Speed enhancements, scanners, and large high-resolution screens that support both color and black-and-white with gray scaling will improve the overall performance of desktop publishing systems. In addition to the new features that megabytes of memory can buy, existing Mac desktop publishing programs and UNIX-based electronic publishing programs like *Interleaf* may be adapted to run on the Mac II.



The Mac II's most obvious advantage is its color capability. Programs such as More, *displayed here on one of Apple's new monitors, are being adapted for color displays. Many applications will offer the option to set colors for the background and menus.*

And of course, graphics software will offer more precision, larger arrays, floating-point calculations, color, and faster imaging. The new Macs will also bring about advances in programming tools. Sophisticated hardware debuggers, in-circuit emulators, hardware probes, and source code debuggers for languages like C and Pascal will undoubtedly be developed by companies like Think Technologies and Consulair. Existing program-development tools like Steve Jasik's *MacNosy* and ICOM Simulation's *TMON* have been retooled and enhanced for the 68020 and new ROM, and other programming tools are bound to follow in their wake.

In the area of sound applications, the Mac II has the power to become a professional recording tool. Companies like Southworth and Opcode are customizing existing products for the 68020 and Apple's sound chips. The Mac II works as a synthesizer as well as a sequencer, playing out through the machine's sound channels as well as through a MIDI adapter connected to the printer or modem port. Various types of interface boards that provide processing assistance and interface to more than two MIDI devices will soon be developed.

The UNIX operating system also presents a host of possibilities. Lutzky Baird is porting its UNIX-based processor to the Apple's UNIX environment. The system will use the Mac II as a UNIX file server. And Eurosoft International is adapting its Macintosh-style UNIX front end, *MacNIX,* for Apple's command-line-oriented UNIX implementation.

The potential use of the Mac II's color, animation, and independent sound-processing features for games is likely to make current Mac games seem primitive. Although most developers may not view the Mac II as an appropriate vehicle for selling games, a few enterprising entrepreneurs are sure to provide some thrills and chills on the Mac II.

priority for the Mac II, especially for producing high-quality color graphics. Many of the major IBM developers have expressed interest in providing video cards, but first they will have to learn the intricacies of the Mac's user interface Toolbox.

Data Acquisition

The Mac II is an ideal machine for laboratory research that involves data acquisition and control. National Instruments has developed a four-channel DMA card, which includes the company's GPIB-Mac interface. The multiple channels allow you to link to other cards on the NuBus. National Instruments is also planning to offer a 12-bit analog-to-digital conversion card with 16 input channels, 2 output channels, digital-to-analog conversion, digital I/O, and a timing function. In addition, the company plans to introduce a multichannel digital-to-analog card, a digital I/O card, and a low-cost GPIB card.

Hard Disk and Input Devices

The new machines will be used in businesses and research facilities, where several users share data and applications. Medium- and high-capacity hard disks, ranging from 40MB to a gigabyte, and optical storage devices will be available. Adon, AST, Corvus, DCC, General Computer, IOmega, LoDown, MacMemory, MDIdeas, Mirror, PeachTree, Reach, Rodime, SuperMac Technology, Univation, Western Computer, Whisper, Xebec, and other hard disk manufacturers are producing medium- and high-capacity internal and external hard disks and tape drives for the new machines. Digitizing scanners from Abaton, AST, Datacopy, Dest, and Microtek will work with the new machines. In addition, Matrix Software has introduced a color-camera interface for producing slides from the Mac screen.

The Apple Desktop Bus (ADB) paves the way for a variety of input devices. Graphics tablets, mice, trackballs, alternative keyboards, bar-code readers, and joysticks connect to the Mac via the ADB. And most important for game lovers, multiple-player games are now possible on the Mac; the ADB lets you attach two or more mice or joysticks for real arcade-style action.

Apple's optional 105-keyswitch detachable keyboard will not be the only IBM-style keyboard. Datadesk, which coincidentally developed Apple's keyboard, has introduced the Turbo-ADB keyboard, which, like Apple's keyboard, includes 15 function keys. Applications like *Microsoft Word* 3.0 that have several levels of keyboard shortcuts can make extensive use of the keyboard's function keys. The Turbo-ADB comes with a software utility for creating and assigning macro functions to any Macintosh application, thereby reducing keystrokes and mouse movement.

A Look Ahead

Hardware and software developers are always pushing the technological envelope, and the new Macs present some interesting challenges and new standards. Presently, all SE accelerator boards put the 68000 to sleep, because no protocol like the NuBus exists for two CPUs sharing the same address, data, and other bus lines. But the next generation of accelerator boards will turn the SE into a dual-processor machine—the 68020 will take charge, while the 68000 functions as an I/O processor. Intelligent peripheral cards will improve the machines' performance. Including a processor like a 68000 or even an 8-bit processor on a communications or graphics card, for instance, makes it possible to off-load some I/O tasks and improve performance. The Macintosh operating system is not a multitasking one, so a coprocessor could implement features like an intelligent modem or image processor that would work in the background. Also, DMA disk controllers will become common in intelligent peripheral cards. Specialized coprocessors for PostScript and QuickDraw that dramatically speed up printing and display will eventually become available.

To accommodate some vertical and scientific applications, enterprising developers will make chassis for buses such as VME and Multibus II. With the flexible ADB, the Mac now has potential as an input device for point-of-sale tasks and factory materials-requirement planning. For example, convenience stores could use the Mac as a cash register or for monitoring and controlling gas pumps. In essence, the Mac has been given a license to go out into the world and solve problems in innovative ways. And it won't be going naked into the world: hundreds of hardware and software options will let you dress the Mac for almost any occasion. □

For details about products mentioned here, contact the companies; see *Where to Buy* for phone numbers.



Datadesk's Turbo-ADB keyboard is designed to work with applications like Microsoft Word *3.0 on the new machines. The keyboard includes 15 function keys, and a software utility lets you assign macro functions to specific keys for any Macintosh application.*

April Fooleries

An electronic jokester opens her trick bag of mostly public-domain pranks

by Erfert Nielson

I'm easily amused. At least I used to be. Not so long ago, you could give me a whoopee cushion or a joy buzzer and I'd be ready for fun. But now that I'm more mature, and computer literate to boot, I'm above such sophomoric shenanigans. In the spirit of technological sophistication, I recently decided to transfer my practical joke collection to magnetic media. After hours of painstaking research, I filled an entire 800K disk with unusual utilities and weird hacks to give the rest of you jokers an idea of the entertaining software that's available.

Although the following collection includes a few commercial and shareware utilities, most of the programs described are in the public domain. If you have access to an on-line bulletin board or a Macintosh user group, you'll be able to put together your own disk of amusing applications.

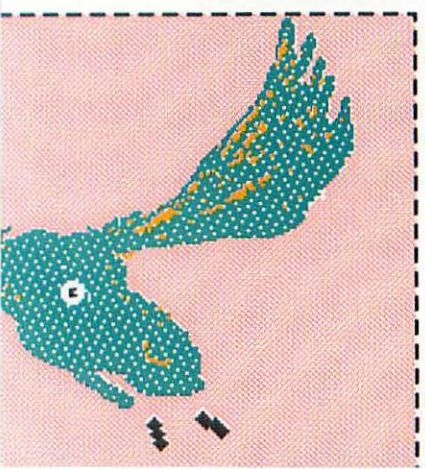


ILLUSTRATION BY JOHN HERSEY

The Start-up Scream

Normally when you turn on a Mac, the computer emits a cheery beep to indicate it's been switched on. Shortly thereafter, a little "happy face" Mac icon appears, followed by the message "Welcome to Macintosh," which is displayed for a few seconds while the system boots. Personally, I can't stand such an excess of cheerfulness first thing in the morning, before I've had a few cups of coffee. When I turn on my Mac, it emits a piercing shriek just after the beep, followed by a brief display of Edvard Munch's "The Scream."

The screen display is made possible by Bill Atkinson's *ScreenMaker,* a public domain application that lets you install a *MacPaint* illustration as the start-up screen—the picture that appears immediately after you insert a disk. You can alter the sound you hear while the disk is loading by using Fractal Software's *Sound Init,* a public domain utility that lets you play a digitized recording—vocal, musical, or other sound effects—when a disk is inserted. Another Fractal utility, *Beep Init,* replaces the double beep that sounds when you make an error, such as clicking outside a dialog box before you've entered the appropriate response. My favorite sound patch is a message that bears an eerie resemblance to the voice of HAL, the pathological computer from the movie *2001:* "I'm sorry, Dave, I'm afraid I can't do that." A number of sounds are available on bulletin boards and user-group disks, but if you don't find the sound you're looking for—and you're willing to invest some time and money—MacNifty's Audio Digitizer, which includes Fractal's *SoundCap* software, allows you to record your own beep-replacement sounds.

A Personalized Desktop

Once you've started up with a bang (or a whimper), it would be anticlimactic to arrive at a drab desktop. Although the Mac's Control Panel lets you edit the desktop pattern (the background screen that appears when you insert a disk), it limits your editing options to patterns produced in an 8- by 8-pixel square. But don't let that stop you. With *DeskScene,* from PBI Software, you can make any *MacPaint* image the desktop background. Applications function as usual, but pushing aside a window reveals the desktop underneath. And *DeskScene* is easy to use. You simply select a *MacPaint* illustration (several are provided on the *DeskScene* disk, or you can draw your own or cull a drawing from a clip-art disk) and then select Install. The utility lets you replace one background with another customized one or with the "plain vanilla" desktop.

To further personalize the desktop, you can use *Icon Switcher,* another PBI utility. *Icon Switcher* lets you modify existing icons or create your own (see Figure 1). *Icon Switcher* customizes both application and document icons. You might want to re-



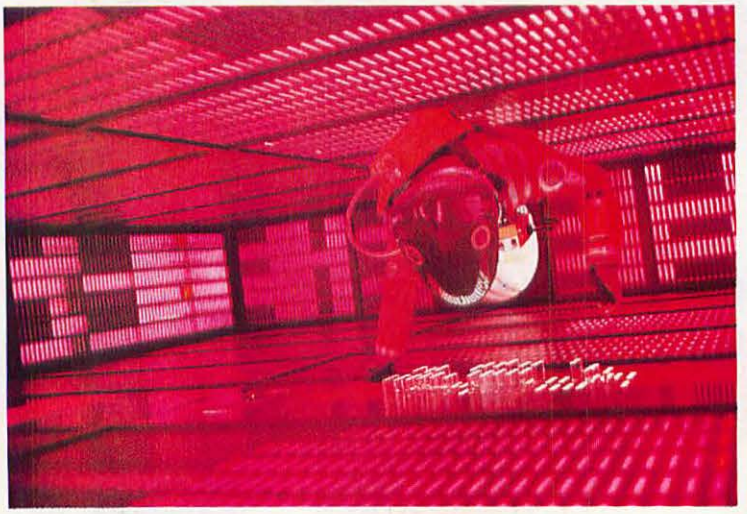
place the *MacPaint* application icon with an easel, for example, and the *MacPaint* document icon with an artfully rendered Campbell's soup can.

Let's Talk

Once you settle in for a hard day's work on your Mac, it's refreshing to receive an occasional visit from *Talking Moose* (see Figure 2). A popular public domain desk accessory by Steve Halls, the moose is a must for Macintosh monkeyshines. The moose itself is installed as a desk accessory; two additional files, *Moose Phrases* and Apple's *MacinTalk* speech driver, must be on disk before the moose can operate. When you select *Talking Moose* from the Apple menu, a dialog box appears with a number of options. You select speech settings, such as pitch and volume, and close the dialog box. Then, at a specified interval, an animated moose pops into the upper-left corner of the screen, uttering endearing comments like "You sure are funny looking when you're tired" or "That's quite a nose you have there!" I prefer to make the moose appear only rarely, causing the uninitiated to say sheepishly, "Um, a little moose just appeared on my screen, and said 'I could learn to love you,' then disappeared." After smiling condescendingly, I gently suggest that my unsuspecting victim take a short break.

If you tire of the moose's built-in phrases (and you soon will, since it has only thirty or so), you can use *Moose Frazer,* a public domain utility by Jan Eugenides, to add your own phrases. *Moose Frazer* conveniently accepts English phrases, sparing those of us who don't speak *AppleTalk* the agony of writing gibberish such as "AOR YUW6 STIHL DHEH7RX#" for "Are you still there?" The English-to-*AppleTalk* converter works pretty well but will occasionally mess up, for example, pronouncing "paste" as "past." Unfortunately, *Moose Frazer* doesn't allow you to remove a phrase in order to edit and replace it (what do you want for free?).

A distant relative of *Talking Moose* is *TalkingKeys,* a shareware desk accessory by Brady Graham. *TalkingKeys,* which also requires *MacinTalk,* has several options: selecting Say Letters causes the Mac to pronounce the appropriate letter aloud as each key is pressed (one of the program's functions is teaching young children the alphabet), while choosing Say Words causes each word you type to be spoken. *TalkingKeys* has a handy sideline probably unforeseen by its author; you can use it to test *Talking Moose* phrases before typing them into *Moose Frazer.* (Like many relatives, *Talking Moose* and *TalkingKeys* don't get along too well. I suggest rebooting before switching from one to the other to avoid a possible system crash.)



Don't get paranoid if your Mac starts calling you "Dave" in the smoothly modulated tones of HAL, the disturbed master computer in 2001: A Space Odyssey*—some joker has probably installed a file of HAL's voice in your system using* Beep Init. *Now, if the Mac starts warbling "Bicycle Built for Two," it may be time to get out the tool kit.*

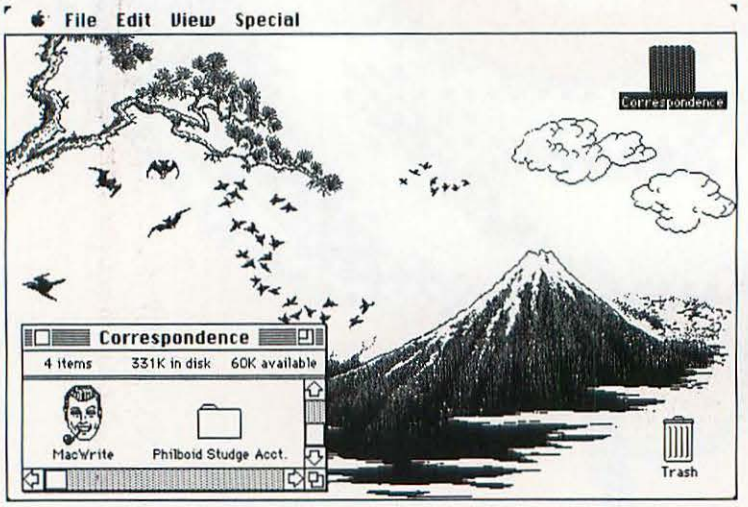


Figure 1
*Two applications from PBI Software—*Desk-Scene *and* Icon Switcher*—allow you to customize your Mac's desktop with images from* MacPaint.

Cursors, Foiled Again!

A number of utilities alter various pointers, making for some humorous effects. *Bouncy,* for example, is a public domain desk accessory that causes the cursor to bounce crazily about the screen, making it almost impossible to catch. Select this one and ask an office mate to help you highlight some text with your new word processor. One of my favorite public domain applications is Bob Finch's *MacWait,* a subtle but enjoyable utility that makes the hands on the wristwatch pointer spin whenever the watch is displayed.

Screen savers for the Mac abound. These accessories blank the screen if the keyboard and mouse aren't touched for a given period of time, preventing unsightly screen burn-in. Therefore, if you drop dead at your desk working late one night, your screen saver will kick in, protecting your screen until someone discovers you in the morning and turns off the Mac. My favorite screen saver is *Gone Fishin',* a public domain desk accessory by Wade Blomgren. When you select *Gone Fishin',* the screen blacks out and a cursor appears in the shape of a pen. Use the pen to scrawl a message concerning your whereabouts, draw a picture, or simply doodle on the

screen while you're talking on the phone. The accessory even provides an eraser in case you make a mistake. Press any key to return to your application.

Curiouser and Curiouser

Most software has at least one bug. As a small diversion, you might install the public domain desk accessory called *The Bug.* When *The Bug* is selected, a small beetle scurries up the screen. The more often you select *The Bug,* the more insects are unleashed. The creatures won't interfere with the document being worked on, but they can be distracting. A more destructive form of vermin inhabits the desk accessory *Crabs.* When you choose *Crabs* from the Apple menu, a hoard of voracious crustaceans scuttles onto the screen and devours a document, menu bar and all (the pesky things even eat dialog boxes)! The crabs are finicky about one thing, though—they won't eat the bugs (see Figure 3). Unfortunately, neither *Crabs* nor *The Bug* work on the Mac Plus.

After your entire spreadsheet has been chewed up by crabs, you might find it necessary to take a coffee break before beginning a new one. (You can retrieve saved documents, but you needn't tell your supervisor that.) While you're away from your desk, why not open *Aquarium,* a charming public-domain program that displays a lifelike fish swimming back and forth across the screen. If *Aquarium* doesn't strike your fancy, you might prefer *Gone Fishin'.*

When you return to your desk, perhaps you have some phone calls to make. If you're like me, you can never remember what time it is in Brussels when it's 3 p.m. local time. With *Clock,* a public domain program by Mark Wall, you'll never again have to consult time-zone charts. When you open *Clock,* a facsimile of a digital clock appears. You initially set the top location to your local time, then enter the number of hours difference (forward or backward) for each of the other five locations, which can be set to any cities you choose. Then, when you click one of the cities, the clock displays that area's current time. (This application borders on the superfluous, but I like it, so I decided to include it anyway.)

If you're occasionally nostalgic for the old days, before your office typing pool was replaced by a roomful of Mac-equipped knowledge workers, you'll enjoy *TypeWriter,* another public domain sound utility from Fractal Software. When installed in a disk's System file, *Typewriter* makes the Mac's keyboard sound like an old-fashioned typewriter, complete with a "ka-chung!" each time you hit Return.

After a hard day of churning out practical jokes, your Mac (which, as we all know, lacks a fan) may become overheated. As a finale you can select *Meltdown,* an amusing public domain program that melts the entire screen into a puddle, oozing slowly to the bottom of the screen. This one has been known to cause quite a few double takes when viewed from a distance.

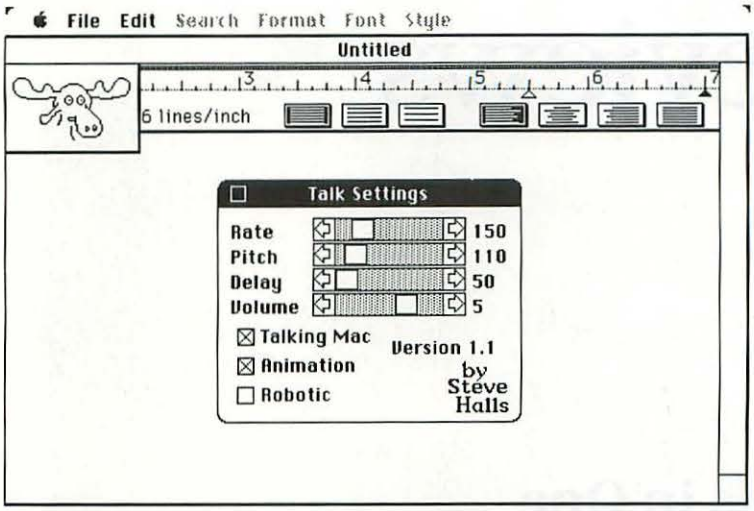


Figure 2
One of the most popular desk accessories of all time is Talking Moose, *an animated character that pops up every now and then to make a wry remark. A companion utility called* Moose Frazer *lets you add your own moose comments.*

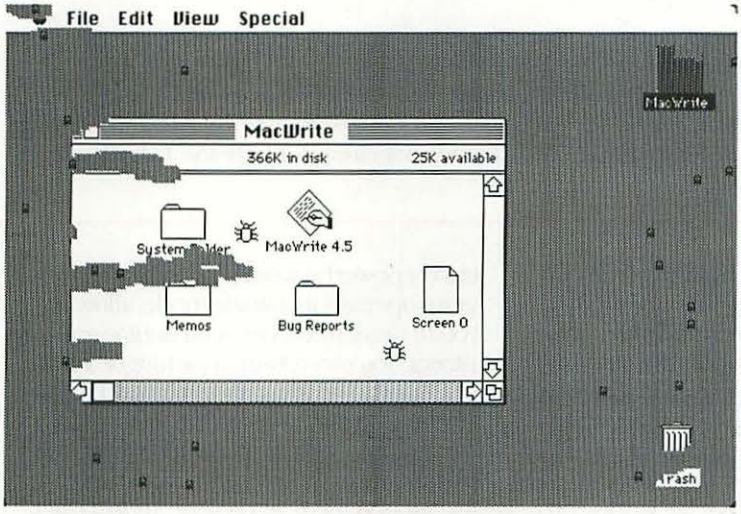


Figure 3
This screen is infested with two kinds of desk-accessory-induced vermin. The Bug *crawls up the screen, while an army of* Crabs *devours everything around it.*

Musing on Amusing

While you may find many of these applications humorous for your own system, keep in mind that tampering with other people's disks is a sin that ranks right up there with opening someone else's mail. Some of the applications I've described occasionally cause crashes, which are decidedly unfunny, especially if a hard disk is involved. I suggest asking for a copy of a friend's disk before "enhancing" it, calling your colleagues over to your Mac to observe strange phenomena, or simply installing strange accessories on your own Mac and letting people discover them at random. A little subtlety never hurts in the realm of practical jokes. Whichever method you choose for displaying your pranks, you're bound to raise a few eyebrows. Have fun!

See *Where to Buy* for product details. □

Reviews

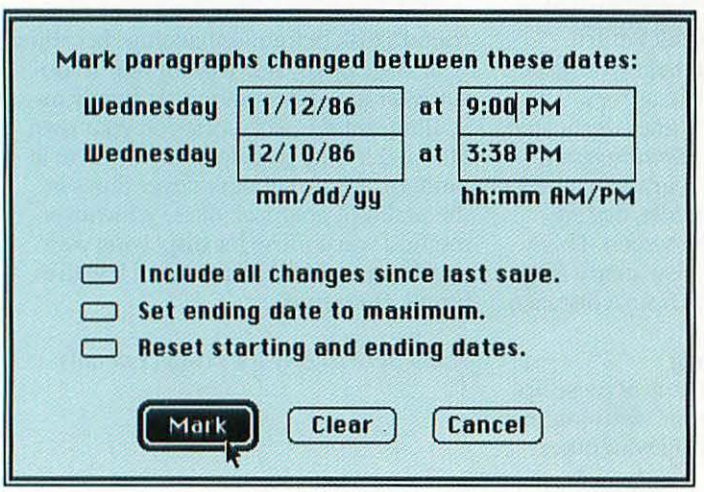
Two Minds in One

***MindWrite** 1.0*

Word processor with integrated outlining.
***Pros:** Smooth integration of outlining tool and word processor; comprehensive searches; user-defined preferences; automatic table-of-contents generation.* ***Cons:** Retains no formatting for* Microsoft Word *files; restricted font sizes; unable to create multicolumn documents.* ***List price:** $125.* ***Requires:** 512K.* ***Copy protection:** None.*

In recent months the veteran outliner *ThinkTank* has been joined by the more full-featured *More* and desk accessory outliner tools like *Acta* and *Voila*. As proficient as these products may be at creating outlines, each falls short when it comes to expanding an outline into a full-fledged document. The convenience of using an electronic outlining tool for writing projects diminishes when you have to alternate between the outline application and a word processor.

MindWrite, from MindWork Software, offers a solution to this problem by combining an impressive outlining tool with a moderately powerful word processor. The program operates in a single mode, allowing you to move freely between outline and document. You can convert a picture or a paragraph into a heading and change it back at any time. In fact, you can mix outlines and paragraphs within a single document. You can also insert graphics, but you can't wrap text around them. At present, *MindWrite*'s word processor lacks such features as multiple columns, footnoting, mail merge, and spell-checking (although it works with *MacLightning* and *Thunder*). In saving and loading files, scrolling, and inserting and deleting words, *MindWrite*'s performance on a Mac Plus is comparable to *MacWrite* 4.5, faster than *Microsoft Word* 1.05, but slower than *WriteNow*. On a 512K Mac the performance is slower than *MacWrite*.



Mark Paragraph
The Mark Paragraph dialog box lets you find all paragraphs revised since the last session.

Minding Your Windows

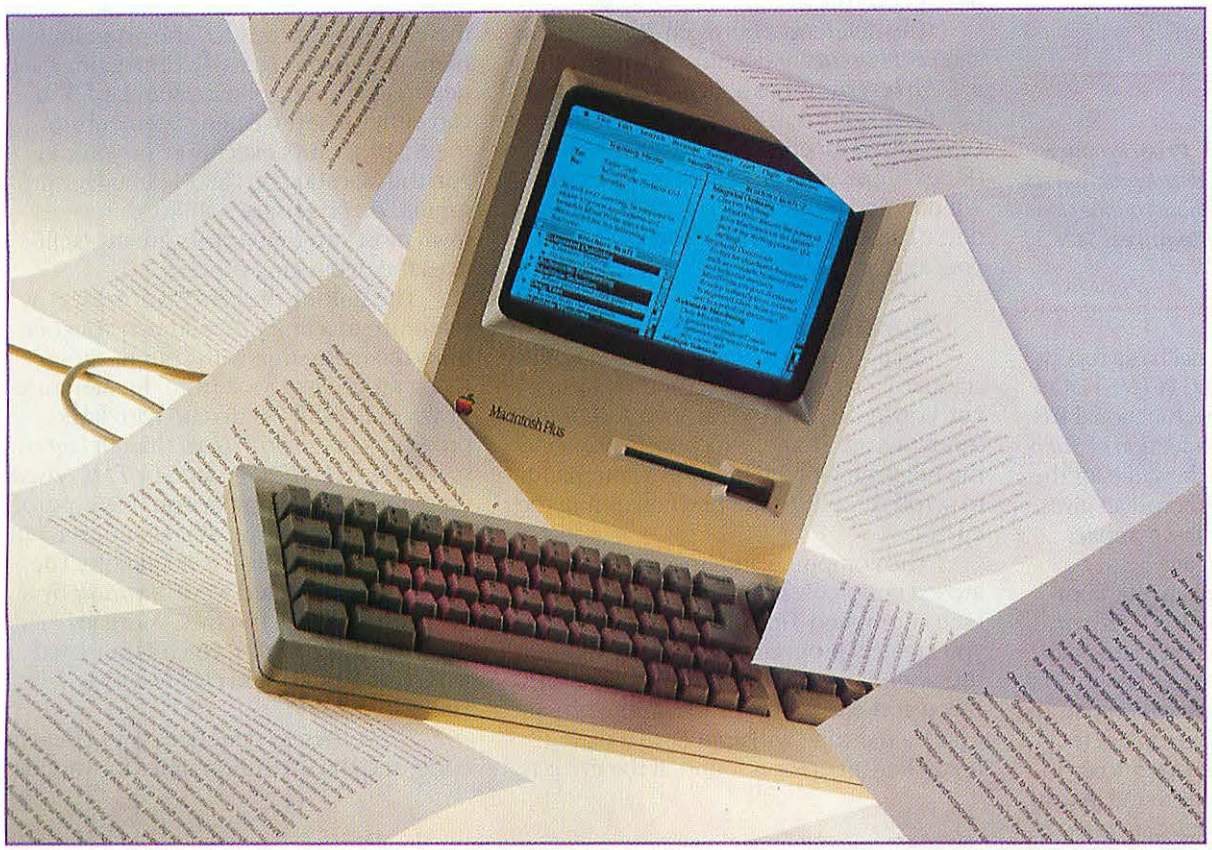
MindWrite's opening document window has specialized window-control buttons in its lower vertical scroll bar. The program permits you to keep multiple document windows open simultaneously, depending on how much memory your Mac has. You can also open several views of a single document or keep your entire outline in one window while you work on a section of the document in another window.

Each time you open a new document you can specify font, formatting, or viewing preferences. You can save a set of default preferences to be used on start-up, as well as alternate sets you can link to specific documents. The program also lets you create a Stationery template for any folder (in HFS), eliminating repetitious typing and setup.

MindWrite embellishes the standard Macintosh user interface. For example, an accumulating Clipboard enables you to save an unlimited number of text snippets; you then selectively cut or copy material from the Clipboard back into your document. Another practical feature is *discontiguous selection; MindWrite* allows you to select many separate pieces of text throughout a document. You can then invoke format, search, or print commands for only those selected groups of text.

Changing Forms

To create an outline with *MindWrite,* you follow the same basic conventions as other Mac outlining applications—simply type your ideas in any order, then select



MindWork's MindWrite *displays a collapsed outline view of a document in one window with detail expanded in another. The hand pointer moves text without cutting and pasting.*

and drag them into the outline using the mouse. Ideas of lesser importance are placed in deeper, subordinate levels; you can always reorganize topics together with their subordinates. As you create an outline, you can show or hide different subordinate ideas, keeping the salient points in perspective without viewing unnecessary detail.

MindWrite allows you to choose and show markings for headings as section numbers, bullets, or diamonds. However, these marks hang outside the outline's margin, and you cannot reformat them. If you move a heading with a section number, *MindWrite* instantly renumbers the outline for on-screen review. You even can mix and match heading markers within a document, a feature that other outliners lack.

MindWrite offers several organizational aids for rearranging topics. You can sort selected headings, shuffle headings in random order, and rearrange items in any order you specify. The program automatically creates a table of contents for each document.

Borrowing a concept from *MacWrite, MindWrite* embeds format rulers within the document. Instead of inserting a new ruler for every format change, you can use one ruler to set parameters for each text level in a document. For example, a single ruler can format several indented tables with identical formats. This capability makes it easy to experiment with different formatting—change one ruler and those changes ripple through the document to all the other text governed by that ruler.

Like most word processors, *MindWrite* lets you search forward or backward, through all or selected text, for a whole or partial word. You can even choose to review passages that have changed since your last review. A correlative feature for quick reference lets you mark any portion of text with a bar at the left margin. The search command can even incorporate wild-card characters, to find and change text that contains patterns instead of absolute matches (for example, you can find all occurrences of a single word, whether it's spelled correctly or not).

MindWrite keeps statistics for each document. The Word Count command summarizes the number of characters, words, and paragraphs—an invaluable feature when you're writing to a predetermined length. By circumventing the Finder, the handy Launch feature saves time when you're switching between applications. The program directly reads and writes *MacWrite* files as well as *ThinkTank* outline files.

MindWrite is easy to learn and use. Whether you create an outline first or jump right into word processing, it doesn't interrupt your thought processes. The program performs best on a Mac Plus or 512K Enhanced. Although not as full-featured as *Microsoft Word, MindWrite* is a good choice if you prepare highly standardized documents like manufacturing plans, engineering specs, or legal papers, or if you want the combined power of an outliner and a word processor within a single application.—*Keith Thompson*

See *Where to Buy* for product details.

PHOTOGRAPHS BY FRED STIMSON

Turbo Pascal Arrives

***Turbo Pascal** 1.0*

Pascal language compiler. ***Pros:*** *Produces efficient, fast code; well documented; program size only 150K.* ***Cons:*** *Linker links more routines than necessary.* ***List price:*** *$99.95.* ***Requires:*** *512K.* ***Copy protection:*** *None.*



Borland International has a reputation in the CP/M and PC(MS)-DOS market for low-cost, functional Pascal compilers. With the introduction of *Turbo Pascal,* Borland now offers the same for the Macintosh. This long-awaited product gives programmers an extremely fast compiler with a built-in editor and linker.

Because *Turbo Pascal* is highly compatible with *Lisa Pascal* and *MPW Pascal,* Mac programmers can build on a large base of existing software. Students and hobbyists will want to use *Turbo Pascal* to compile and run textbook examples, which do not require a knowledge of *Inside Macintosh.* To run the basic Pascal programs found in textbooks, *Turbo Pascal* emulates a standard 80-character by 25-line terminal. *Turbo*'s Console unit converts standard Pascal input and output statements for the Mac's bit-mapped screen. The Console unit can handle commands that position the cursor or clear the screen, such as GoToXY and ClearScreen.

For those who wish to write full-fledged Macintosh applications, *Turbo Pascal* provides complete access to the Macintosh ROM Toolbox. *Turbo Pascal* also includes TurtleGraphics, a collection of simple graphics routines that are easier to use than QuickDraw, though less flexible. And the package also includes Apple's *RMaker,* a resource compiler with carefully documented methods for creating desk accessories.

Turbo Pascal allows programmers to compile most *Lisa Pascal* programs, virtually without change. *Turbo Pascal* maintains source-level compatibility with *Lisa Pascal* in most situations, including compiler options. In terms of compatibility with *Lisa Pascal, MPW Pascal* gets an A+ (they are based on the same compiler), *TML Pascal* gets a B+, and both *Lightspeed Pascal* and *Turbo Pascal* get Bs. Although it is not mentioned in *Turbo Pascal*'s documentation, *Turbo Pascal* and *Lightspeed Pascal* are almost completely compatible at the source level.

The differences between *Turbo Pascal* and *Lisa Pascal* are documented in the manual. *Turbo Pascal* has a slightly modified UNIT statement that ignores segmentation. Generalized function returns are not allowed (for example, you can't dereference FrontWindow and InfoScrap). The EXIT statement doesn't accept a parameter, and CONST expressions are not allowed.

Working with Turbo

Turbo Pascal's editor function is fairly standard, providing search and replace, cut, copy, paste, and so on. Two additional functions are Home, which returns you to the beginning of the file, and a command to scroll directly to the line containing the cursor.

The compiling and linking processes are exceptionally fast with *Turbo Pascal* (see "Compiled-Time Comparison"). When you create a program with *Turbo,* you have the option of compiling to RAM or to disk. If you compile to RAM and run the program, a message will appear in a dialog box when an error is found. If the error is in the source, you can click the Resume button and instantly return to the editor at the line containing the error (as long as the error doesn't destroy the program in memory). *Turbo Pascal*'s debugging facilities are, for the most part, standard. You can either insert written statements to trace a program's execution, or you can run the MacsBug or TMON debugger programs. *Turbo Pascal*'s ability to recover from most run-time errors greatly facilitates the debugging process.

The linking process is very fast. Any reference to a unit procedure or function links the entire unit with your program. Using programs I took from the literature or wrote myself, I ended up with larger programs in *Turbo Pascal* than in *Lightspeed Pascal, MPW Pascal,* or *TML Pascal* (see "Code-Size Comparison"). With small programs, this overhead is significant, but with large programs it is negligible. The programs I compiled were *MiniEdit* by S. Chernicoff, *FileDemo* by C. Morgan, *CatchMe* by B. Perez (which I translated from C to Pascal), and *HFS List* by J. Halleck.

Turbo Pascal generates very efficient code, and the execution times for various

Execution-Speed Comparison

	Progress Output	No Output
Lightspeed Pascal	177 seconds	0.9 seconds
TML Pascal	22 seconds	0.8 seconds
MPW Pascal	25 seconds	0.9 seconds
Turbo Pascal	27 seconds	0.3 seconds

Execution-Speed Comparison
The time required to perform 20 iterations of the Sieve of Eratosthenes and to solve a 9-disk Towers of Hanoi problem.

Code-Size Comparison

Compiler	MiniEdit (S. Chernicoff)	CatchMe (B. Perez)	FileDemo (C. Morgan)	HFSList (J. Halleck)
Lightspeed Pascal 1.0	12,017	5156	8501	10,874
TML Pascal 2.0	10,611	3894	6809	4576
MPW Pascal 1.0B2	11,102	4012	7017	6218
Turbo Pascal 1.00A	17,007	10,932	13,527	13,912

Code-Size Comparison
The amount of disk space (in bytes) that the final application will take up after being compiled and linked. MiniEdit *and* FileDemo *are text editors with full Macintosh interface support.* CatchMe *is an icon chasing game.* HFS List *is a basic Pascal program that reads the directories on all mounted volumes and prints them (using writeln) to a file.*

benchmarks, such as the Sieve of Eratosthenes (an array indexing and integer math benchmark) and the Towers of Hanoi (a test of recursive procedure calling), are consistently faster in *Turbo Pascal* than in any of the other compilers tested (see "Execution-Speed Comparison").

Compiled-Time Comparison

Lightspeed Pascal	61 seconds
TML Pascal	89 seconds
MPW Pascal	192 seconds
Turbo Pascal	11 seconds

Compiled-Time Comparison
The time it takes to compile and link MiniEdit, *thereby creating a stand-alone application.*

Borland has a lot of experience in documenting compilers and languages, and it's put to good use in *Turbo Pascal*'s 460-page manual. The manual's style is informal without being silly, and the material is covered concisely. A good table of contents and index make it easy to find what you're looking for. The manual first discusses the use of the editor, then the compiler. After the manual takes you through the logical progession of creating textbook programs, you learn about writing a Macintosh application, and about units and how to create and use them. The user's guide includes a reference section and appendixes that provide a comparison of *Turbo Pascal* with other Pascal dialects (primarily *Lisa* and *American National Standard*), a complete list of all compiler and run-time error messages, a summary of compiler options and unit interfaces, and a discussion of TurtleGraphics.

Borland's *Turbo Pascal* is a quality product at a reasonable price. For those who wish to move programs from the MS-DOS or UCSD Pascal worlds, *Turbo Pascal* has no equal. And for those who want to create stand-alone Macintosh applications, *Turbo Pascal* is very competitive and lower in price than all but *TML Pascal* (which is only $1 less). —*Denis Cohen*

See *Where to Buy* for product details.

Just Between Formats

MacLink Plus *1.0a*

File conversion utility. ***Pros:*** *Easy to use; built-in telecommunications simplifies transfer between Macintosh and IBM PCs and compatibles; retains most formatting attributes.* ***Cons:*** *Limited support for* Microsoft Word. ***List price:*** *$195.* ***Requires:*** *512K or Mac Plus.* ***Copy protection:*** *None.*



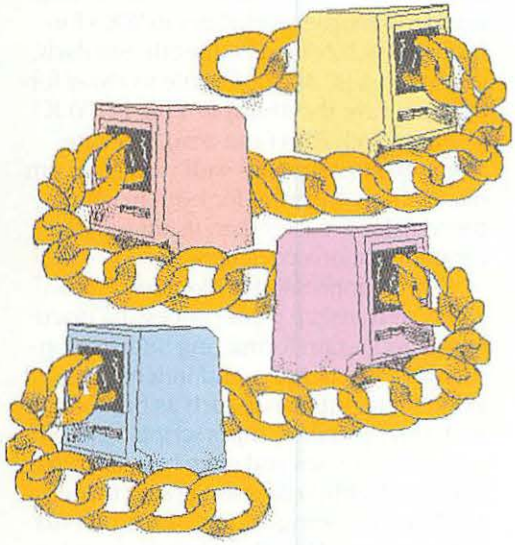
One of the Mac's great strengths is that its friendly interface insulates users from the underlying technicalities of file organization. But when you need to convert files between programs, that insulation is stripped off, exposing you to the chilling cold of field delimeters, SYLK, DIF, and text attributes. And when you exchange files with an IBM PC, you're in the tundra of telecommunications technology: protocols, modems, and cables. With DataViz's *MacLink Plus,* file transfer is not reduced to a single keystroke, but the program minimizes the number of procedures involved in transferring a file. The manual contains helpful conversion basics organized according to spreadsheet, word processing, and database documents. DataViz also provides a troubleshooting section and a quick-start guide.

The Jump

MacLink Plus includes a cable and communications software for both the Mac and the IBM PC. An 800K Macintosh disk contains the *MacLink Plus* application and various settings documents, which store translator and communication settings for a particular conversion task. The PC disk is a 5¼-inch MS-DOS disk with a communications transfer utility. The PC program is menu-driven, with only a few commands for adjusting communications settings. Whether you're converting a file from a PC to the Mac or vice versa, you use the Macintosh application to select the formats of the original and converted files and initiate the translation process; the PC program simply acts as the sender or receiver.

MacLink Plus works on three levels. "Local desktop mode" lets you convert documents that are on Mac disks or made to appear on the Mac's desktop by such network products as *MacServe* or *TOPS*. "MacLink mode" lets you convert documents between the Mac and a PC connected via a supplied cable. If your Mac and PC are on the same desk, you'll probably use this mode most often. Finally, the "special communications mode" lets you convert documents between the Mac and another computer.

Assuming that the Mac and the PC are on the same desk, a typical *MacLink Plus* file conversion session works as follows. After connecting the Mac to the PC, start *MacLink Plus* on the PC, making sure its baud rate and connection settings are correct. Next, return to the Mac and click the Set Translators button; doing so displays a new window with two list boxes, each showing the file formats that *MacLink Plus* supports (see "File Translators"). When you select *MacWrite* in one box, the other displays several possible formats for the converted document: *MultiMate, WordStar,* text-only, and document content architecture (DCA), a format readable by such PC programs as IBM's *DisplayWrite 3* and WordPerfect Corporation's *WordPerfect.*



After you choose a format for the destination document, click the Select Files button to display a list of available files. Finally, select the file you want to convert, choose a PC drive and subdirectory if you like, click the Convert and Transfer button, type a name for the converted file, and sit back. (If you are converting to a PC, *MacLink* automatically suggests a file name by

ILLUSTRATIONS BY MARK ULRICH

taking the first eight characters of the Mac file name and adding the appropriate PC document extension.) *MacLink Plus* converts the file into the selected format (leaving the original unchanged), then transfers it to the PC. You need not choose any commands on the PC to begin receiving the file. *MacLink Plus* tells its PC counterpart to begin receiving. Similarly, when transferring a file from the PC to the Mac, *MacLink Plus* controls the PC, telling it when to send the file you selected on the Mac.

MacLink Plus translates spreadsheet data to let you transfer documents between *1-2-3, Multiplan,* and *Symphony* on the PC, and *Excel, Jazz, Microsoft Works,* and *Multiplan* on the Mac. That sounds impressive, but *MacLink Plus* cheats somewhat by relying on the data-interchange features built into the programs. To convert an *Excel* worksheet to *1-2-3* format, for example, you must use *Excel*'s Save As command to save the worksheet in WKS format, which *1-2-3* reads directly. Similarly, to convert a PC *Multiplan* file to *Excel* format, you save the *Multiplan* file in SYLK format, which *Excel* can read. Because *MacLink Plus* supplies well-matched communications software for both machines, the transfer is easier than using separate communications packages.

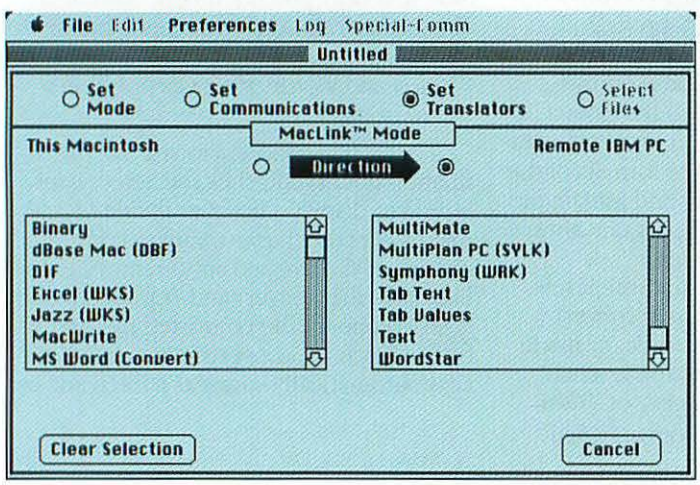
More impressive is *MacLink Plus*'s ability to translate word processing documents and retain formatting information such as tabs, margins, and indents, as well as character attributes such as boldface, underlining, italics, superscripts, and subscripts. Footnotes and page breaks aren't translated, although DataViz says those capabilities are being added. *MacLink Plus* fully supports *MacWrite,* but support for Microsoft's *Word* was minimal in the version I tested. You can translate between Mac *Word* and PC *Word,* but not without using Microsoft's *Convert* utility first–another example of relying on built-in translation software. DataViz also says improved *Word* translators are in the works. I encountered one quirk in text-to-*WordStar* translation: *MacLink Plus* ignores single carriage returns at the ends of paragraphs and instead runs paragraphs together. To work around the problem, place an extra carriage return between each paragraph.

Communications Is the Key

MacLink Plus is also a serviceable communications program. It lacks advanced communications features such as terminal emulation and an autopilot facility for creating auto-log-on sequences, but it does support the MacBinary Xmodem protocol for sending and receiving applications and formatted documents.

The ability to transfer files between the Mac and the PC is nothing new; you can do it with an ImageWriter cable and a pair of communications programs (see "The PC-Mac Transfer," *Macworld,* October 1985, and "The Macintosh Data Exchange," *Macworld,* December 1986). *MacLink Plus*'s strengths are its automation of the transfer process and its support for formatting and text attributes in word processing documents. Although most spreadsheet programs let you save worksheets in formats that permit document exchange, *MacLink Plus* simplifies file transfer with an easy-to-use communications facility. *MacLink Plus* is most useful to people transferring word processing documents between the Mac and the PC.–*Jim Heid*

See *Where to Buy* for product details.



File Translators
MacLink Plus's Translators window shows the direction of a data transfer and lists the supported file formats in two boxes. Selecting the format of the original file causes MacLink Plus *to narrow the list in the other box to show only the appropriate destination formats.*

A Porsche among Mac Disks

DataFrame 40-XP

40-megabyte hard disk. ***Pros:*** *Fast; compact; good customer support.* ***Cons:*** *Expensive; doesn't chain transparently with other SCSI drives.* ***List price:*** *$1999.* ***Requires:*** *Mac Plus or Mac 512KE with added SCSI port.*

Using a program on the Macintosh is like staging a relay race where the 68000 Microprocessor runs the first leg, the memory runs the second, and the disk drive runs the last. If one of these team members is out of shape, so is your Mac.

SuperMac Technology's DataFrame 40-XP speeds up that final leg. The 40-megabyte hard disk is fast, and SuperMac's driver program accelerates large data transfers. Although it's expensive, the compact size and low noise level help make the 40-XP a good choice for a personal hard disk, while the speed and capacity make it powerful enough for multiuser applications.

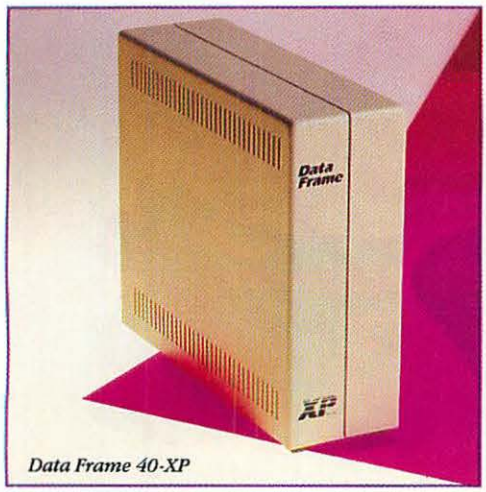
Inside the Disk

The hardware is well designed. The DataFrame 40-XP sits alongside the Macintosh rather than underneath it, which helps to avoid heat buildup. It's very compact and can easily be carried in a briefcase. (SuperMac sells a carrying case for $49.95.) The disk is louder than average when reading and writing to disk, otherwise it's quiet. There is no fan. The power supply is on top, where its heat won't bother the other components, and there are plenty of cooling slots.

The DataFrame is easily disassembled. This is particularly convenient when you're removing the internal SCSI terminating resistors to hook up more hard disks. Chaining multiple SCSI hard disks to a Mac is something of a black art, and I had a problem using the DataFrame chained together with other disks. If a DataFrame in the chain is turned off, the Mac will not start up from another disk; if all the disks are turned on, however, it will.

Utility Software

The DataFrame comes with a complete set of utility programs. On-screen procedures aren't as clear as in other utility programs, such as the HyperDrive



Data Frame 40-XP

FX20, so you should read the documentation first. Instead of a hardware solution (using tweezers to remove jumpers for instance), SuperMac displays and lets you change the SCSI address with a Change ID program. As with most hard disk utility programs, you can update the disk-driver software, or else reformat the whole disk (if the disk structure gets corrupted by a buggy program or a power failure) with an Init program. SuperMac lets you *park* the disk's read/write heads; that is, you can put the disk heads in an area where there is no data—an additional feature that makes traveling with the disk a little safer.

SuperMac supplies SuperBackup to back up data and SuperSpool to spool ImageWriter output. With SuperSpool, you can use the Mac for another task before you finish printing the document. SuperBackup is comprehensive, borrowing heavily from Personal Computer Peripheral Corporation's (PCPC) *HFS Backup* program and adding the capability to back up to another hard disk, as well as to floppy disks. Unfortunately, SuperMac has a more awkward approach to selecting files and folders for back up. Also, the version I tested changed the modification date when it restored a file from backup. This can be a problem if you rely on the modification date to distinguish file versions. Default settings for the *file filter* present another problem. If you're not careful, your System and Finder files, including your personal desk accessories, will be excluded from your backup.

SuperSpool will save a lot of time printing to the ImageWriter; it's flexible and fast, with a desk accessory that lets you pause, resume, delete, and reorder printouts. It won't print through AppleTalk to the LaserWriter or ImageWriter, but SuperMac Technology plans to release a LaserWriter spooler.

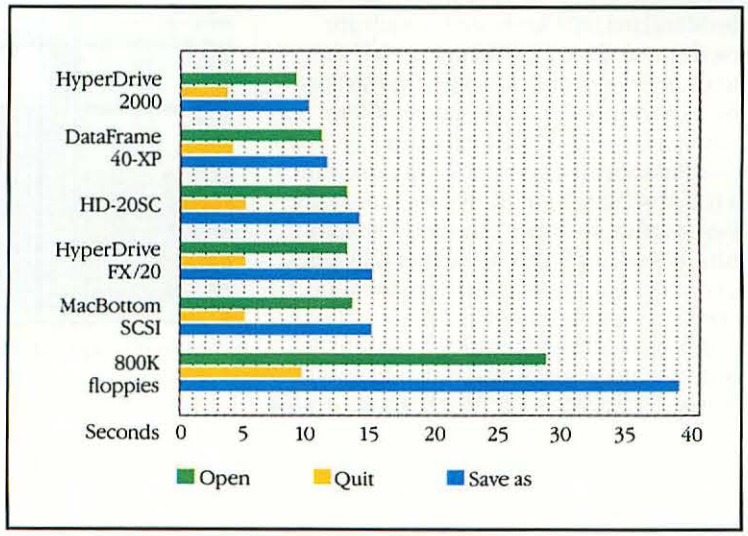
Support when You Need It

Every hard disk manufacturer has defective units that escape the company's quality control procedures. SuperMac offers a one-year warranty and supplies replacement units quickly, either from the company or through its many dealers. This response has earned the respect of Mac owners in user groups and on electronic networks, like CompuServe and Delphi. In addition, SuperMac has a program that will actually try to recover the data from your DataFrame if something goes wrong.

The DataFrame 40-XP is quiet, compact, and fast, and it performed reliably during the month I tested it. SuperMac Technology has steadily improved its software, since the introduction of the DataFrame 20. I'd probably use PCPC's *HFS Backup* instead of SuperBackup. Still, while chaining multiple drives together may be awkward at times, I liked this hard disk so much that I may even buy one.
—Ric Ford

See *Where to Buy* for product details.

Performance Tests
This graph shows the performance of the DataFrame 40-XP working with MacWrite *on a newly initialized hard disk. Details of the test may be obtained from MacInTouch, P.O. Box 786, Framingham, MA 01701.*



Where the Wild Buffalo Roam

Great Plains Accounting Series *4.1*

Accounting software. ***Pros:*** *Feature-rich; good audit trails and controls; flexible.* ***Cons:*** *Marginal Mac interface; expensive.* ***List price:*** *$695 per module (Purchase Order $395); various support costs. Available modules—General Ledger, Accounts Payable, Accounts Receivable, Payroll. Planned modules—Inventory, Job Costing, Order Entry, Purchase Order.* ***Requires:*** *512K; Mac 512KE or Mac Plus; HFS; hard disk; keypad or Mac Plus keyboard.* ***Copy protection:*** *None.*

I really tried hard to like the *Great Plains Accounting Series.* After all, the company has extensive experience with accounting software, and each module in the series has most of the features anyone is likely to need. Unfortunately, it's tough to enthusiastically endorse software with a marginal Macintosh interface, a price about double the cost of the hardware the program runs on, and expensive support costs.

The Habitat

Version 4.1 of the *Accounting Series* is the latest update of the *Great Plains Hard-Disk Accounting Series.* Basically, the manufacturer has added many enhancements, removed the multiuser capabilities, and repackaged the software. The user interface has been modified quite a bit in an effort to make it more Macintosh-like, but it still looks and feels like it was converted in the days before pull-down menus and point-and-click operation.

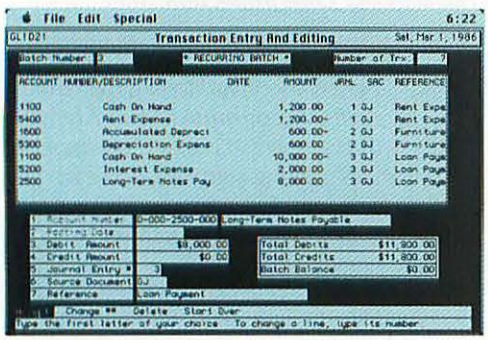
It's impossible to describe all the features of the four modules I looked at (General Ledger, Accounts Payable, Accounts Receivable, and Payroll) in a review of this length. Here are some highlights:

General Ledger. A flexible chart of accounts adaptable to almost any organizational structure; provides good control over the format of financial statements; integrated with all other modules in the series.

Accounts Receivable. Transaction types include invoices, debit and credit memos, sales returns, and prepayments. Stores detailed customer information and historical transactions; handles freight, sales commissions, discounts, and finance charges; accepts open-item and balance-forward customers; prints invoices and statements.

Accounts Payable. Transaction types include manual and computer-generated checks, debit and credit memos, prepayments, finance charges, and flexible invoice payments. Handles detailed vendor information and historical transactions.

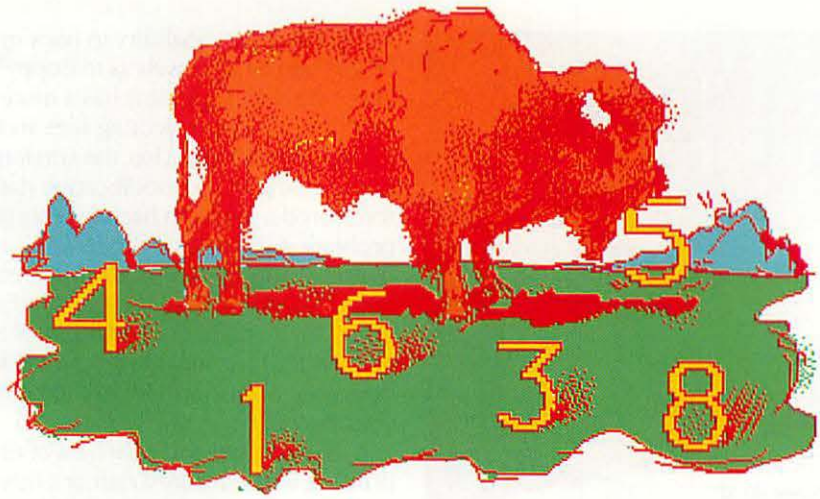
Payroll. Generates checks and lets you enter manually prepared checks; supports flexible deduction types and tax withholding; tracks personnel-related information such as sick leave and vacation time; voids and reprints checks; performs comprehensive reporting and tracking to meet various tax requirements; covers a variety of pay and deduction categories.



General Journal Window

The General Ledger transaction-entry window is typical of many of the Accounting Series' *data-entry windows. Each line is added or edited using the fields at the bottom of the window. You enter command codes, listed at the bottom, to initiate an action.*

Each module is flexible and adaptable to a variety of business needs. All let you create recurring transaction batches so that you don't have to reenter information every month (see "General Journal Window"). Great Plains provides accurate and complete audit trails and thorough data-entry error-checking. A useful set of reports is included for each accounting program.



Adaptation

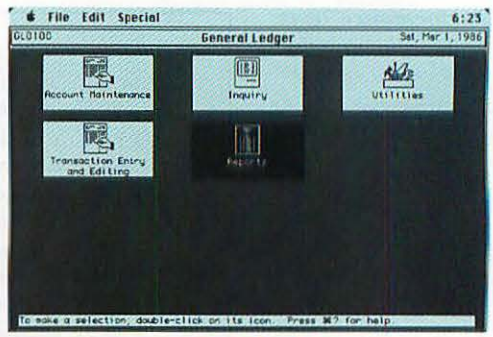
Compared to other accounting packages available for the Mac, *Great Plains Accounting Series* has as many features and undoubtedly more modules. If features were the only issue, I'd have few complaints. But Great Plains falls short of its competitors in the user interface. The series was designed to run on both Macs and MS-DOS systems. The desire to fit into both system environments results in some unusual program characteristics. For instance, when you enter batches of transactions, the screen refreshes every time you enter another line. This slows down data entry, the most common operation in an accounting product.

Great Plains makes substantial use of special function and alphabetic command keys. In fact, you must have a keypad or a Mac Plus keyboard with the built-in keypad to use this software. In addition, there's a Special menu to the right of the Edit menu with choices for Page Up, Page Down, Home, and End, four functions found on the standard IBM keyboard, which are used to scroll windows in which all the items are not visible at once. This strikes me as a user-interface design problem, not a limitation of the Mac keyboard.

Probably the most notable annoyance is the absence of pull-down menus. While the program includes standard File and Edit menus and the Special menu just described, all program functions are activated by clicking screen icons (see "General Ledger Module Window"). There are nested windows of icons, much like in character-based menu-driven systems, that force you to navigate through a series of screens to make your next choice. Eventually you get to the data-entry or report-selection screen you're searching for. These icon-based choices would be more usefully presented in a series of pull-down menus.

My biggest complaints are with Great Plains' pricing and support policies. The full set of modules, which should be available by the time you read this, will cost $5260, about twice the cost of a 512K Mac with a hard disk. But that's not all. Toll-free support, after 30 days, costs $50 plus either $25 per phone call or $600 a year. Maintenance fees for federal plus three state tax tables are an additional $150 per year. Also, you're only entitled to 30 days of free support if you've never bought a Great Plains product before. But I never once got through to the support people.

The *Accounting Series* is not easy to use. You may well need a trained consul-



General Ledger Module Window

Accounting Series *program functions are activated by clicking a series of icons. Each click leads to another set of icons in another window until a data-entry or report-selection window appears.*

tant or CPA to help you get up and running (in fact, Great Plains has a list of trained third parties ready and waiting, for a fee). Although the package is comprehensive and has good documentation, it's overpriced—you could spend more than $10,000 for a complete, single-user system with support—and it takes only marginal advantage of the Mac interface. I'd like to see Great Plains upgrade the series into a complete, windowed product for the Mac and lower the price. I can still recommend the *Accounting Series,* but not if you've come to rely on a fully implemented Mac interface. As it is, this product might be an endangered species.—*Steve Mann*

See *Where to Buy* for product details.

Professional C

***Aztec C** 1.06*

Development system. ***Pros:*** *Completely integrated environment; UNIX-like tools; symbolic and source-level debuggers.* ***Cons:*** *Difficult to learn if you don't know UNIX.* ***List price:*** *Commercial $499, Developer $299.* ***Requires:*** *512K.* ***Copy protection:*** *None.*

Aztec C from Manx Software Systems was one of the first native Macintosh development environments. The *Aztec C* system consists of a UNIX-like shell, a C compiler, a 68000 assembler, and a linker. It includes comprehensive Macintosh and standard C libraries, sample source code, utility programs, and the first C source-level debugger on the Macintosh.

The Shell

The entire *Aztec C* development system revolves around its shell. UNIX users have an advantage; the ability to work with a command-line interface is essential if you hope to fully exploit the capabilities of the *Aztec C* system.

By operating from within the shell, you speed up the development cycle, since the output of one tool can feed directly into another. You can add functionality to the system by writing utility programs or tools that run under the shell, such as an enhanced printing program. Manx also provides a number of utilities such as *grep,* a sophisticated string-searching tool.

Text Editor and Compiler

The primary text editor in the *Aztec C* system is a utility called *z,* which is based on the UNIX text editor *vi.* The *Aztec* editor supports parenthesis and bracket matching and allows you to jump quickly to the next or preceding function. Through the use of regular expressions, you can search for character-string patterns and literal character strings. Series of commands can be grouped into macros. By using the utility program *z,* you can build a macro that cross-references your code by automatically finding and opening files based on the names of functions. For those not inclined toward a command-line-based text editor, the *Aztec C* system also comes with Apple's window-based text editor.

The C compiler fully implements C; supports recent additions to the language, such as enumerated types; and generates symbols for *Aztec*'s source-level debugger. The compiler operates quickly and produces tight code. To further reduce compilation time and optimize code you can precompile your *#include* files and compile down to an assembly-language listing. *Aztec C* supports the Pascal declaration, eliminating the need for assembly-language "glue" routines; however, in-line assembly language is supported in C source files.

For most C programmers, the assembler will be transparent in the development cycle, since the C compiler automatically invokes the assembler after completing compilation. The macro assembler generates relocatable 68000 object code, which is then used by the linker. The linker can create stand-alone Macintosh applications, drivers, desk accessories, and tools that run under the shell. To minimize the size of the final application, the linker doesn't include unused code in the final application. The linker is also capable of linking relocatable modules created by the Macintosh Development System (MDS).

The *Aztec C* development system includes a number of libraries, several in source code, which implement both standard C and Macintosh functions. These libraries include floating-point and transcendental functions, standard C I/O, console I/O, and implementations of AppleTalk and SCSI routines.

A Complete System

The real strength of the *Aztec C* system is that it is a complete development environment with numerous utilities. The *make* utility helps streamline the development cycle by recompiling only those source-code files that have been modified. Some other text manipulation utilities allow you to compare two source files and print out the differences between the two, or to search through multiple files for complex text patterns. *Aztec* even provides its own resource compiler, called *rgen.*

The *Aztec C* system has two debuggers. The first, *db,* is a symbolic assembly-language debugger that lets you reference memory locations by name or address and list the calling sequence of functions. Sequences of commands can also be combined into macros to be executed later. One feature helps you isolate problems in your code by displaying the parameters and return values of functions. The second debugger, *sdb,* is the first C source-level debugger on the Macintosh. It debugs your code at both the C and assembly source level. Memory can be referenced and displayed via C source names or using C expressions. You can trace on either a line-by-line or a call basis, where the parameters and return values of a function are displayed upon entry into and exit from the function. The source-level debugger lets you inspect the values of your C data structures, making it easier to catch errant values.

Aztec C's strength comes from the completeness of the system as a whole. The system handles large projects very well and produces efficient, compact code. The final release version (1.06i) will run under the Macintosh Programmer's Workshop shell and will support the 68881 floating-point coprocessor. *Aztec C*'s biggest strength and its biggest weakness are both, paradoxically, its shell. The beauty of a shell environment is the efficiency with which you can invoke the various programming tools and the control you have over the interaction of the tools. In addition, the environment can be readily expanded by simply adding more tools. Unfortunately, a command-line interface is difficult for the novice to learn. *Aztec C* is on the pricey side compared to other development environments, but you get one of the most complete development environments available, with a year's worth of free updates to boot.—*Jim Takatsuka*

See *Where to Buy* for product details.

A Consumer's Guide to Disk Carriers

This review compares wallet, easel, and portfolio disk carriers. Overall design and construction are evaluated for 15 products ranging in size from 4 to 32 pockets and priced from $7.95 to $29.95.

Anyone who uses a Macintosh as a work tool builds a large collection of floppy disks, even hard disk drivers. Eventually you may feel inundated and wonder how to organize, store, protect, and transport all these 3 ½-inch squares of plastic.

Some Solutions

Disk carriers were invented to help users transport their disks conveniently and safely, but they also serve to store disks at home. They come in a range of colors and three sizes (wallet, easel, and portfolio), and are priced from $7.95 to $29.95. All are made of water-repellent nylon, stitched in nylon seam binding, with Velcro fastener strips. Here the similarities among disk carriers end and comparative shopping begins.

Manufacturers design wallet carriers to be lightweight and slim. Usually a carrier holds a disk or two per pocket. Only the Executive Wallet from West Ridge has a firm inner construction—a stiff plastic support. All companies use 400-denier nylon, a particularly tough and durable type of material; Executive Wallet comes with an outer shell of heavyweight ballistic nylon, leather trim, and a thin 400-denier interior. These antistatic disk wallets take up little space and are fairly smooth to the touch, which limits snagging. However, this smoothness can be a problem if the pockets are too wide for the recommended number of disks, making it easy for them to slide out. Only Floppy Wallet from American Covers has a flap to prevent disks from falling out.

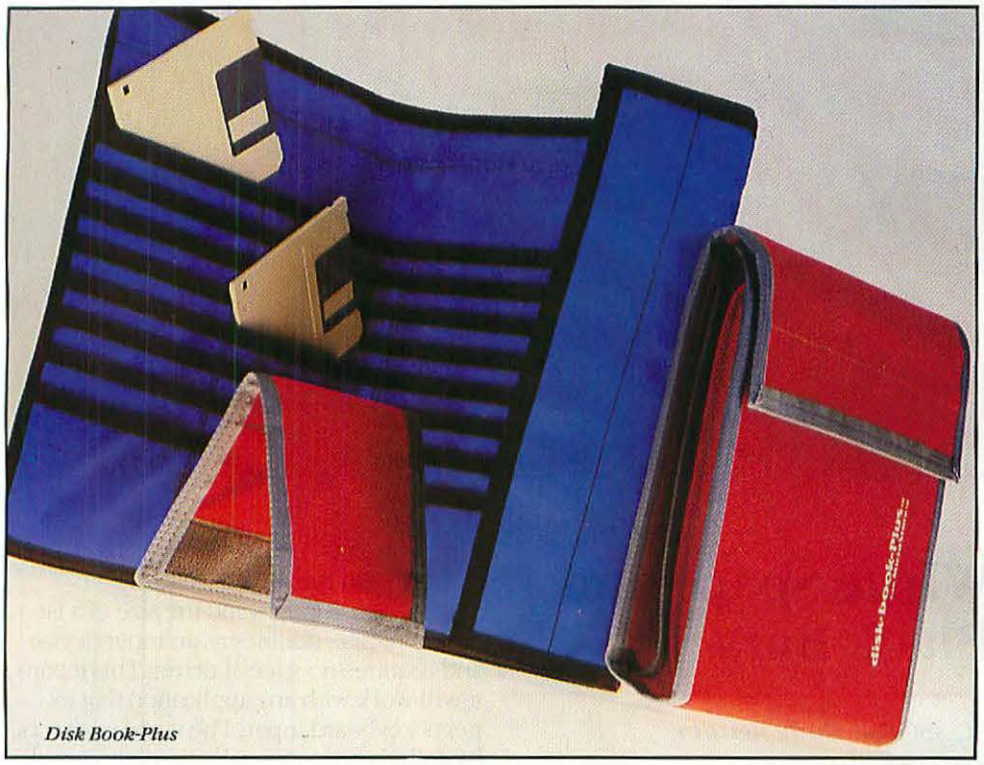
The Traveller-4 wallet carrier from MicroStore is really a billfold: it measures 4¾ by 9¼ inches when open, has two pockets that open toward the centerfold line, and holds up to four disks. Like all MicroStore carriers, the Traveller-4 has no exposed seams or stitching on which disk shutters can catch; the Velcro strips are stitched to the outside of the pocket and the ends are tucked under the nylon seam binding, which has mitered corners. When full, the Traveller-4 weighs only four ounces and fits in the inside pocket of a man's suit coat.

Grander Designs

Like a painter's easel, disk easels stand up on your desk and double as holders and carriers. They have interior stiffeners and hold 20 to 24 disks in two columns on two sides. When you set up the easel on your desk, it gives you a full view of each disk label. ITC's Easel has the thinnest stiffener and its fastener is unstable, consisting of 1½-inch strips of Velcro. When loading this

Disk Carriers Compared

Manufacturer	Item	Maximum # of Disks	# of Pockets	Do Disks Slide out when Holder Is Open?	Comments
Wallets					
American Covers	Floppy Wallet	18	9	yes, even when full	Velcro too close to fold; edge sharp
CompuCover	DiskWallet	6	6	yes	Velcro strips not aligned
Computer Cover	Pak Ups	8	4	yes, from one pocket	good value for the price; corners can be sharp
ITC	Pocket Pak	10	6	no	Velcro strips not aligned; heat-sealed edges sharp
MicroStore	Traveller-4	4	2	no	excellent overall design; smooth, rounded edges
MicroStore	Traveller-8	8	4	no	see above
MicroStore	Traveller-12	12	6	yes	smooth, solid construction; disks fall out
West Ridge Design	Executive Wallet	8	4	yes	pockets too wide to hold disks in safely when open
Easels					
CompuCover	DiskWallet	20	20	no	antistatic nylon
ITC	The Easel	20	20	no	stiff fabric; water-repellent
West Ridge Design	Disk Easel	24	24	no	lightweight; good closures; solid stand-up support
Portfolios					
MicroStore	DiskBook-10	10	10	no	excellent design and construction
MicroStore	DiskBook-Plus	16	16	no	see above
MicroStore	DiskBook-32	32	32	no	see above
ITC	Disc Directory	32	32	yes	fabric too thin for such large portfolio



Disk Book-Plus

Extras	Rating (1 low, 3 high)	Folded Size (inches)	Price
	1	5 by 9¼	$9.95
business card slot	1.5	4¼ by 8⅞	$9.95
business card slot	2	4½ by 8¾	direct: $9.95, $16.95/ two; $11.95 retail
business card slot	1	4⅜ by 8¾	$13.95
	3	4⅝ by 4¾	$7.95
	3	4¾ by 8¾	$11.95
	1	4¾ by 8⅝	$13.95
leather trim	1.5	4½ by 9¼	$12.95
	2.5	9⅛ by 10¾	$16.95
business card slot	2	9 by 10½	$19.95
warranty against defects	3	9 by 9½	$20.00
room for pen; warranty	3	4¾ by 8¾	$14.95
room for 2 manuals, notepad, pen; warranty	3	9 by 11	$29.95
room for pen; warranty	3	9 by 11	$29.95
business card slot	2	9½ by 11¼	$29.95

easel, be careful to balance the two columns on each side so it won't tip over.

CompuCover's DiskWallet has a heavy interior stiffener that rattles when you move it; its fastener has an ample 3 inches of Velcro contact, but the pockets are shallow and cover only the bottom 2½ inches of the disk. West Ridge Design's Disk Easel has the deepest pockets (3 inches); the edges are folded over once, stitched without heat-sealing or binding, and smooth. This model alone provides soft padding in addition to the firmer plastic structure, yet it is also the most lightweight.

Portfolios are notebook-style holders. When closed they resemble small, padded binders and are easy to carry or store on a shelf. These portfolios range in size from 4¾ by 8¾ inches to 9½ by 11¼ inches, and hold from 10 to 32 disks. The DiskBook-10 from MicroStore is small enough to fit in a handbag, and all four portfolios I tested fit in a briefcase. The DiskBook-Plus has room for 16 disks, a notepad, two manuals, and two pens. Its fabric is designed to take lots of wear and tear, and the foam padding and plastic interior stiffeners protect disks better than wallets or easels do.

The Winning Edge

Binding is important for protecting edges and providing durability. Every manufacturer binds nylon trim around the outer edges, and most cut and heat-seal the bindings at each corner. Only MicroStore and American Covers fold and miter their binding around three corners, giving a smooth and rounded touch. Heat-sealed edges, when made well, prevent fraying and snagging. Most of the edges I examined were sufficiently smooth, with two exceptions: American Covers' Floppy Wallet and Computer Cover's Pak Ups.

For stitching, 100 percent nylon thread is more durable than cotton-polyester thread, which deteriorates and can stretch out of shape. CompuCover and ITC products are stitched with polyester threads, whereas the other manufacturers use nylon. Products that have 7 to 9 stitches per inch resist most snags, while seams with fewer than 6 stitches per inch, particularly of cotton-polyester, can easily come loose.

Pocket edges are particularly important with Macintosh disks. Their movable metal shutters can snag on sharp or flimsy edges; sometimes they even catch on folded and stitched edges. This can of course seriously damage the surface of your disk. Manufacturers use a variety of techniques to bind the pocket edges. The

best design is MicroStore's; its products are made from single-piece fabrics, with folded fabric edges on the wallet pockets and heat-sealed edges on the portfolio pockets.

The Final Score

I have rated each disk carrier on an ascending scale of 1 to 3 based on quality, design, function, and value (see "Disk Carriers Compared"). Products scoring 2.5 or higher have excellent overall design and functionality, hold disks securely, have smooth edges and mitered seams, and are constructed from high-quality materials. Products with sharp edges, dangling threads, pockets that don't hold disks securely, or poor Velcro receive the lowest ratings.

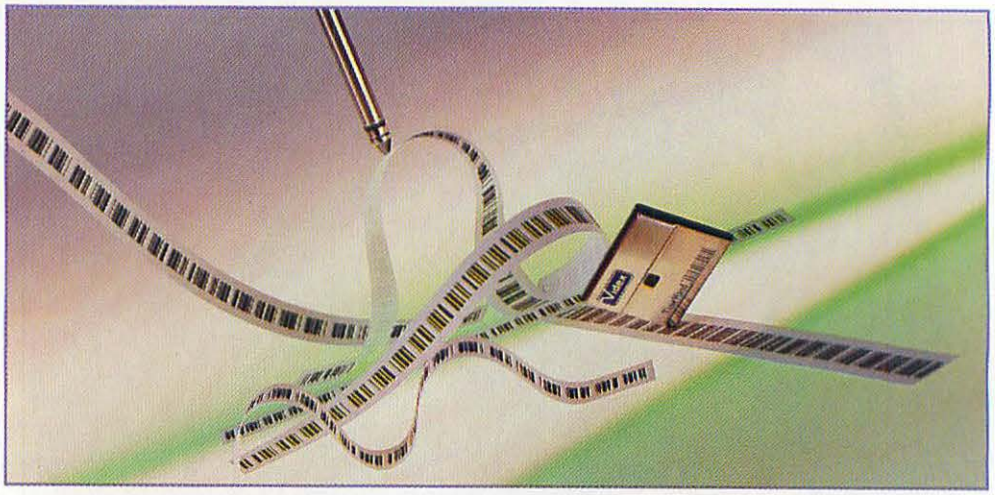
For wallet design I like the Traveller-8 because it securely holds even a few disks, and its seams are smooth, rounded, and kept to a minimum; it has no edges to snag disks and is thin and lightweight. A slightly less expensive choice is Pak Ups: disks don't fall out when it's full, and its bindings are smooth except for the sharp corners. It also has a clear plastic pocket for your business card.

Among the easels, each priced at around $20, the padded Disk Easel is the superior product. It holds up to 24 disks and has better protection and greater stability when propped up on your desk. The pocket edges, although only turned over once and stitched, are smooth. Both West Ridge and MicroStore guarantee their products.

Among portfolios, the DiskBook-Plus is my favorite because I occasionally want to carry more than ten disks, pens, notepads, and a manual. I like the DiskBook-32 (priced the same as other larger portfolios—$29.95) for storing my disks on a shelf. The 1000-denier cordura nylon and 100 percent nylon stitching will last a long time, and MicroStore guarantees your disks will stay put regardless of whether the DiskBook is open or closed.

Whether you want a carrier to hold 1 disk or 32, or something in between, there probably is a product to fit your needs and budget. Remember to get one that will hold disks securely and that won't jab you with sharp edges; ask the dealer to let you examine it before you buy. If you have special requirements, don't hesitate to contact a manufacturer and see if the company can supply what you need.—*Barbara J. Chan*

See *Where to Buy* for product details.



White Space and Black Bars

PC-380 Bar Code Reader

Bar-code reader. ***Pros:*** *Easy to set up; allows direct input to Macintosh.* ***Cons:*** *Nonportability limits applications.* ***List price:*** *$795;* Bar Code Printing Program *(V1.3) $250 ($100 if purchased with PC-380).* ***Requires:*** *128K.* ***Copy protection:*** *None.*

TimeWand Barcode System

Bar-code reader. ***Pros:*** *Reader is portable.* ***Cons:*** *Requires one of the Mac's serial ports.* ***List price:*** *$198 (2K), $228 (8K), $248 (16K); Recharging Download Station $120;* TimeWand Manager *$489;* The PhraseMaker *$299.* ***Requires:*** *512K.* ***Copy protection:*** *None.*



Bar codes—those rows of tiny vertical stripes with numbers underneath—are now de rigueur on product labels. Their secret? Both the white spaces and black bars represent a sequence of numbers that can be optically read by a scanning device.

Now you too can use bar codes—to streamline inventory, to develop accurate methods for tracking sales and production, or even to manage files. Two new products bring this technology to the Macintosh user: PC-380 Bar Code Reader by TPS Electronics and TimeWand, a portable, time-based bar-code reader by Videx, Inc.

PC-380 Bar Code Reader

PC-380, a long wand the size of a fat ballpoint pen, doubles as an input device and requires no special driver. This means it will work with any application that expects keyboard input. The wand connects by coiled cord to a small aluminum interface box, and the box converts scanned bar codes to keyboard data. Since it draws power directly from the keyboard port, PC-380 doesn't require an electrical outlet or any of the Mac's data ports. However, the trade-off for direct data input is its nonportability. While useful for applications like retail point-of-sales, file management, library control, and production tracking, PC-380 would be inappropriate for taking inventory throughout a warehouse or any other application requiring mobility. PC-380 does allow you to collect or enter data quickly and accurately without having to type, but you can't manage or manipulate it without the aid of a database manager like Blyth Software's *Omnis 3 Plus* or Odesta's *Helix*.

PC-380 comes equipped to read both Code 39, the most popular code for business and manufacturing concerns, and the UPC bar code used in retailing. Since it can discriminate between the two kinds of codes, you needn't reprogram your bar-code reader to read both.

Although a simple procedure, scanning does take a little practice. To use PC-380, hold the wand upright, then sweep the code evenly with the wand's tip. It will softly beep confirmation when it's able to read, and the results will appear on the screen. However, it won't beep or register entries if you scan improperly or if it doesn't recognize the bar code as Code 39

or UPC. PC-380 may be purchased with software that allows you to generate your own bar-code labels, with or without a description of the code. You are given the choice of using existing text-file information or creating a new sequence of bar codes. You can enter your own label specifications in inches and print to either an ImageWriter or a LaserWriter. The printing program may also be purchased separately.

If you only want to read bar codes, ready-made labels are available from companies such as Seton Name Plate or Data Composition.

TimeWand Barcode System

The battery-charged TimeWand Barcode System is portable and resembles a credit card in size and shape. It is one component of a larger system that includes a downloading-recharger unit and software.

Although TimeWand's portability is an important feature, especially for inventory applications that can't be accomplished through a control point, the extra steps of configuring your TimeWand, downloading, and then converting raw bar-code data to a useful format can be tedious and intimidating.

TimeWand automatically time- and date-stamps each scan, which makes it useful for time-management applications.

Although TimeWand is activated simply by pressing a button, maintaining this pinch-grip for any length of time might become a strain. Like PC-380, TimeWand beeps confirmation in response to a successful bar-code read. However, it also beeps for other reasons: when hardware fails, when memory is almost full, and so on. Although the manual contains a complete listing of these beeps, chirps, and clicks, they can be confusing. We prefer the simplicity of PC-380's single confirmation beep.

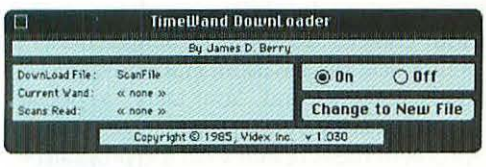
TimeWand is programmed to read Code 39 (3 of 9), but any other bar-code system can be used, and Videx will update software that may not include the option you require.

Depending on the model, TimeWand can hold from 2 to 16K memory (nearly two thousand bar codes for a 16K reader before you have to download). Although its batteries hold a charge for three to five days, leaving the TimeWand in its recharger during periods of inactivity guards against the 10- to 14-hour work delay a complete recharging requires.

The downloading-recharging unit, which is small enough to sit comfortably on your external drive, requires its own power supply and plugs into either of the Mac's serial ports. Download raw bar-code data by inserting your TimeWand in the unit. Press the scan button, open the downloader desk accessory, and turn it on. You can monitor the activity from the TimeWand Downloader window (see "Activity Monitor") and if that's not enough reassurance, a light will flash on the downloader, you'll hear a clicking noise, and the Mac's internal drive will begin to whir. This indicates that data has been transmitted and is automatically saving to a Scan File, a text file that should be imported to *TimeWand Manager* for cross-referencing and formatting before it's exported to your preferred database, which might not recognize the time and date data. *TimeWand Manager* can sort, perform calculations, and print limited types of reports. The next release will be faster, able to batch up to 16,000 scans, and include macros.

If you already have some sort of software system for tracking or managing data, you may feel that bar codes would only complicate data entry. Videx offers an alternative to using *TimeWand Manager,* which simplifies an otherwise tedious process. *The PhraseMaker* is an accessory program that allows you to enter data directly from TimeWand to your software application by storing scripts that transform your Scan File and then enter the data—seemingly from the keyboard.

Implementing a bar-code system for use with your Macintosh may cost you over $1000 just for the hardware and software, so plan carefully. While TimeWand is better suited for applications that require mobility, remember that the nonportable PC-380 allows you to input directly to your Mac and may be less troublesome to set up and use.—*Eileen Drapiza and Christopher Osburn*



Activity Monitor
TimeWand provides a window for monitoring downloading. The Downloader is accessible from the Apple menu.

See *Where to Buy* for product details.



Tomb It May Concern

Arazok's Tomb *1.0*

Graphics and text adventure game. ***Pros:*** *A good, long-playing comic book that won't let you turn a page until you've solved its puzzle.* ***Cons:*** *Pointless sound effects; frustratingly slow reverts from many inevitable deaths; no help for players who get stuck.* ***List price:*** *$49.95.* ***Requires:*** *512K.* ***Copy protection:*** *Not copyable.*



Your wisecracking associate at the newspaper brings word that your friend Daphne and her uncle have vanished while investigating rumors of evil magic in Scotland. The rescue effort begins in a densely drawn forest surrounding Caer Arazok, ancient lair of the dreaded, Druid-like priest/hacker—a place of magic portals as well as abandoned, hidden, high-tech cities. Although a few fierce enemies must be defeated in order to challenge Arazok, this is not a game of battle but a game of tricks and traps, won by wits.

Since *Arazok's Tomb,* from Aegis Development, is virtually self-explanatory, the thin manual is barely necessary. You find numerous objects along the way, including weapons and magic items that may or may not be useful and may even be fatal. Most objects (and all important clues) are described (or hinted at) in the scrolling text window as

well as pictured on the screen. A compass and up/down buttons for mouse commands are provided; nondirectional commands are typed. A clock display ticks off the time between the adventure's start and the death by thirst or hunger that awaits the misguided or unobservant.

As in all worthwhile adventures, there are many ways to die en route to the encounter with Arazok and Daphne's rescue, most of them by fair-game means rather than syntax sabotage. But dying becomes more than symbolically annoying because of the program's slow revert procedure.

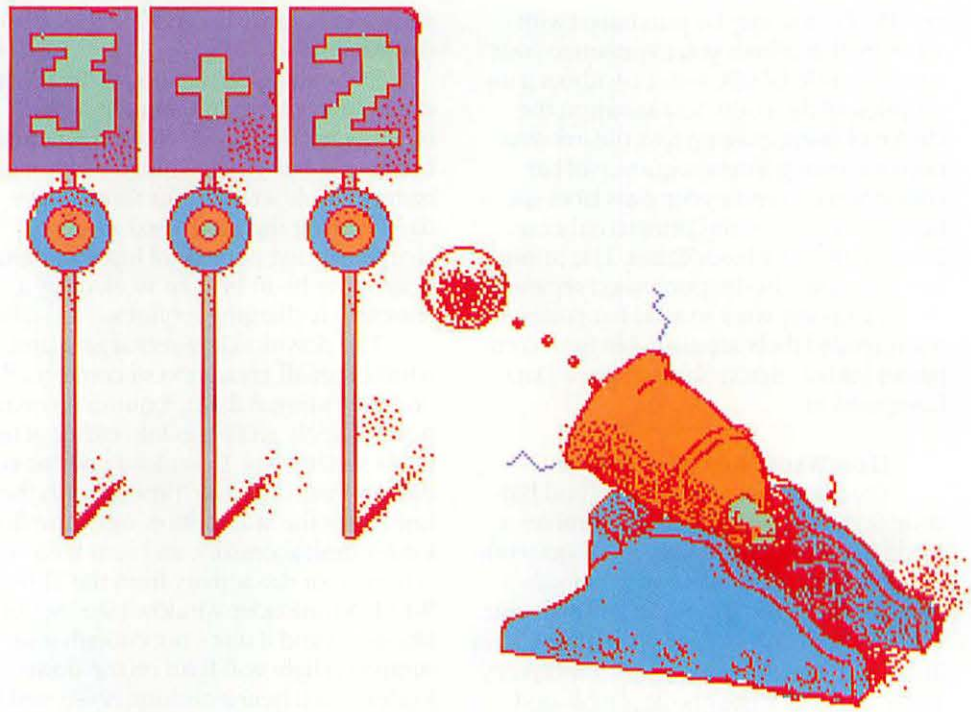
Clock Ticks vs. Facial Tics

Arazok's Tomb features sound effects and voice synthesis that you can turn on or off from the pull-down menu. But neither the ticking of the clock (which is the main sound effect) nor the voice synthesis (which usually just repeats a command you have entered) contributes much to the game. In a couple of places where you really expect a nifty sound effect, like whooshing through an underground transport tube, there is none. This game would have been better with no sound and more motion. Motion always adds something, even when it is only one movement in a given scene, such as the passage through a magic portal or the flicking tongue of a giant snake.

The graphics of *Arazok's Tomb* may lack the elegance of Antonio Antiochia's work in the *Transylvania* games, but the drawings playfully suggest Indiana Jonesian adventure mags. Some hallway scenes are obviously recycled, but there are dozens of different locations with things to discover and examine, carry around, wear, consume, and, of course, die from.

Arazok's Tomb is one of the best text adventure games, thus no easy win. Determination finally does lead to victory in Arazok's tomb, but there's no 800 help number or hint option for those (probably many) who get seriously stuck. Until this is remedied, "stuckees" should call Aegis Development at the number listed in *Where to Buy*.

Taking its cue from the old pulp magazines, the game displays a smattering of mild "adult" language and female nudity, rendering the parental guidance notice more a lure than a necessity. The game is much more adult in the level of skill and patience required than in its content. There are a goodly number of hours of absurdly complicated comic book adventure in *Arazok's Tomb,* for those inclined toward such pleasures.—*Keith McCandless*



See *Where to Buy* for product details.

Arithmetic Explosion

Math Blaster

Educational game. ***Pros:*** *Easily customized for individual student needs; arcade game format motivates students; maintains student-progress records.* ***Cons:*** *Limited to basic drills and practice exercises; inadequate for complex problems requiring several steps.* ***List price:*** *$49.95.* ***Requires:*** *128K.* ***Copy protection:*** *Not copyable.*

Math Blaster from Davidson & Associates has been around for some time and has made its mark in the field of educational software. It's been a best-seller (and has won several awards) on Apple II, Commodore, and IBM computers. What's new is that it's now available for the Mac.

Math Blaster doesn't pretend to teach complex reasoning skills, creativity, or even advanced arithmetic skills like long division. Instead, it focuses on helping students memorize basic arithmetic relationships for quick and accurate recall. The lessons in *Math Blaster* range from the simplest addition problems taught in early grades to percents and fractions generally studied in the upper grades of elementary school. But the program is probably best suited for first-, second-, and third-grade students who spend much of their school time memorizing addition, subtraction, multiplication, and division tables.

Choose Your Calculation

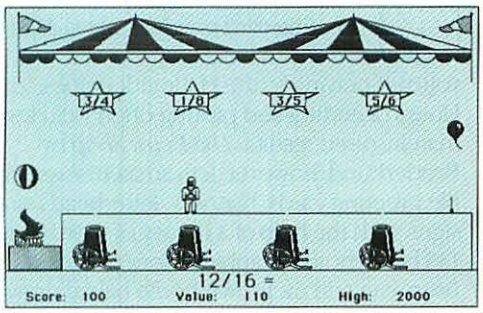
The drill-and-practice exercises in *Math Blaster* are displayed as icons in a menu that dominates the main screen. This main menu allows you to select an icon representing the skill you wish to practice. Your choices are Addition, Subtraction, Multiplication, Division, Fractions, Decimals, Percents, and "Your Data," a special icon that allows you to open customized problem files created with the program's editor.

Once you've chosen a skill, the main menu screen is replaced by an activity screen, from which you choose a level of difficulty, a format, and an activity. Format choices are vertical (stacked numbers with

a line above the answer), horizontal (such as 6 × 6 = 36), or mixed. There are four types of activities: Look and Learn pauses after displaying each problem and then gives the solution. Speed is adjustable. Build Your Skill displays each problem and waits for you to type the answer (or click on digits with the mouse). Your score appears at the end of the session, and you have an opportunity to try the problem again if you got it wrong the first time. Challenge Yourself shows the same problem with a different part of the equation missing (such as 7 + __ = 11). It's your job to fill in the blank. And finally, Math Blaster, the program's namesake, is a multiple-choice arithmetic drill dressed up as an arcade-style circus game (see "Fracturing Fractions"). This entertaining and playful option is largely responsible for the program's present popularity.

Your mission is to maneuver the on-screen character over the cannon that's aimed at the correct answer to the problem; when you click the button, he blasts the answer and you earn points. A seal with a ball on its nose acts as a timer for each problem, and a sinking balloon times the game as a whole. Quick-witted players can buy extra time by watching the balloon and pushing it up when it approaches the pin.

Two distinctive features are the program's editor and its individual-student data files. The editor allows you to create supplementary problem sets tailored to a particular child's needs. And the individual data files allow teachers and parents to track the progress of students as they work through lessons at their own pace.



Fracturing Fractions
Here the Math Blaster *player has moved the character to one of the cannons that's pointing to a wrong answer—⅛. To earn points the student must move the character to the correct fraction and click the mouse to fire before the ball reaches the seal's nose.*

Is *Math Blaster* an effective educational tool? As you might expect, it's certainly no substitute for skilled teachers or patient parents; but it does provide an efficient and engaging way for students to practice basic arithmetic skills in school or at home. And the Math Blaster game option is especially useful for motivating students to practice at home, where schoolwork typically runs into heavy competition with toys and television for kids' attention. *Math Blaster* may not hold a laser to *Lode Runner* for arcade action, but it's light-years ahead of flash cards and worksheets as an entertaining way to learn math tables.
—George Beekman

See *Where to Buy* for product details.

Shareware Communications for the Mac

MockTerminal *4.3*

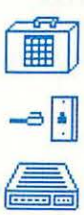
Desk accessory terminal program. ***Pros:*** *DA format obviates the need to quit application.* ***Cons:*** *Limited capabilities.* ***List price:*** *$35 (for* MockPackage.*)* ***Requires:*** *128K; takes up 13K in System file.* ***Copy protection:*** *None.*

FModem *0.97*

Small terminal program. ***Pros:*** *Auto-redials several numbers in series; clickable macros.* ***Cons:*** *Problems downloading from* Switcher *partition.* ***Shareware fee:*** *$20.* ***Requires:*** *128K; works with RAM disk in 512K.* ***Copy protection:*** *None.*

TermWorks *1.28*

Small terminal program. ***Pros:*** *Auto-log-on; works with* Switcher. ***Cons:*** *Limited macros; bombs when downloading to full disk.* ***Shareware fee:*** *$20.* ***Requires:*** *128K* Switcher *partition or RAM disk in 512K.* ***Copy protection:*** *None.*



With so many sophisticated communications programs available for the Macintosh, why would anyone bother with simple shareware products? For starters, because they're less intimidating to a novice than more powerful offerings that have a bewildering array of options for all occasions. They're also small enough to coexist in memory with a RAM disk, or to share a single-sided disk with another application and a System file—so, you can cut the time you spend switching between programs.

Additionally, you can experiment with shareware products before you buy them and then pick the one that best suits your needs. The bottom line, though, is that for the price of a meal for two at your favorite restaurant you can get products that handle most communications jobs surprisingly well.

For this article, I looked at three small programs: the desk accessory MockTerminal, by CE Software, and two stand-alone applications, *FModem* and *TermWorks*. *FModem* and *TermWorks* have more features and better interfaces, but tests showed all three programs download Xmodem files at about the same speed. The programs can be learned on screen, and helpful documentation is available for them, although it may not be distributed with the programs.

MockTerminal

MockTerminal is part of CE Software's *MockPackage* of four desk accessories, which includes a word processor, a text-file printer, and a chart maker. MockTerminal's DA format and compact size (12,903 bytes) make it ideal if you must interrupt other tasks to communicate. It fits comfortably in a System file and, once invoked, can continually redial a number in the background until the connection is made. Early versions could only transfer text files, but the latest (4.3) adds Xmodem capability.

The MockTerminal menu shows 11 items. The first 5 are for selecting speed (300, 1200, or 2400 baud, Full or Half duplex). A Dial command lets you pick one of up to seven numbers from a separate Terminal Number file or enter a new number. Play Back refers only to text files: Send File and Receive File cover Xmodem transfers.

As you might expect in such a compact program, there are some performance limitations. Settings that rarely change can be set only by the separate *MockPackage Utility* program. MockTerminal does not automatically save screens; what falls off the top is lost unless you pick Start Recording beforehand. Furthermore, disk space is

A Few Specifics

Feature	MockTerminal	FModem	TermWorks
Prints	no	yes	yes
Edit commands	no	no	yes
Archives screen	no	yes, memory	optional to disk
Text save and send	yes	yes	yes
XModem	yes	yes	yes
Alternate protocols	no	FModem	no
Emulates	TTY	TTY, VT52, AppleII	TTY
Macros	no	sets of 10	10
Shows transfers	yes	yes	yes
Auto log-on	no	no	yes
Hangup command	yes	yes	yes
Dial command	yes	yes	yes
Documentation	yes	yes	yes

FModem, MockTerminal, and TermWorks offer the same basic terminal functions, but they differ in features such as support for the Clipboard, auto-log-on capabilities, and automatic redialing of a series of numbers.

not automatically checked before a download; running out of space aborts the transfer while you're still on line and paying for the time.

FModem

The *FModem* menu shows a double row of ten clickable macro keys that you can use to designate strings of characters. Clicking on a macro key sends a string, or modem command, on its way. If ten keys aren't enough, you can store and load as many others as you like, although only one set of ten can be used at a time. Additionally, the file-transfer dialog box is quite informative, giving the file name, the number of errors, and how long it will take to complete a download or upload.

The Dial menu lets you pick several numbers for *FModem* to dial serially until it makes a connection—invaluable when trying to reach perpetually busy bulletin boards. Also, the program keeps incoming text in memory, so you can scroll backward to view it and print the recalled text. Parameter settings and the macro file in use are identified at the right end of the macro bar; you click on the setting to change parameters.

At 60,499 bytes, *FModem* is much larger than MockTerminal, but only a quarter the size of *Smartcom II*. It has many features of larger programs, and it automatically sets speed and terminal emulation mode for each service dialed. Minor limitations include the absence of command keys for menus or macros and no support for Edit commands. The version I reviewed (0.97) works with System 3.2 but bombs with the old System 2.0.

TermWorks

The *TermWorks* interface resembles *FModem*'s, but macros and settings are controlled by menus rather than shown on a status bar. It opens to a file named Untitled that is stored on the program disk, where it saves dialog from successive sessions. Thus, you may be surprised by dialog from a long-forgotten session on your printouts, unless you change the default to Stop Recording, save input as a titled text file, or trash the Untitled file.

Even at 37,182 bytes, *TermWorks* has a few features the larger *FModem* lacks. The most important is an auto-log-on facility, which can respond to input signals. It can't handle long dialogs, but it works with services such as GEnie and Dialcom. Other helpful touches include an indicator of space left on the program disk (but not on other disks) and a session timer. One strength *TermWorks* shares with *FModem* is the informative display of file transfer progress.

The program has some annoying quirks. Although *TermWorks*' ten macros can be invoked by ⌘-key combinations, they do not have mnemonic names. More seriously, *TermWorks* bombs if it tries to download an Xmodem file to a disk without enough room for it.

Fast Food for Thought

MockTerminal fills a special niche as a time-saver for short communications that interrupt other work. You should have the *MockPackage* anyway, if only for the invaluable MockWrite. (A license for MockWrite also covers MockTerminal.) If you need more functions than MockTerminal provides, *FModem* or *TermWorks* are both good choices, since they are easy to use and supply virtually everything you'll need for day-to-day communications. Try both and pick one. For the $20 license fee, it's a bargain.—*Jeff Hecht*

See *Where to Buy* for product details.

Home-Baked, but Pre-Cooked

***The Print Shop** 1.0*

Stationery printing program. ***Pros:*** *Good combination of sample projects, graphics, and graphics editor.* ***Cons:*** *Some graphics cartoonish; command buttons placed in different locations on different screens.* ***List price:*** *$79.95.* ***Requires:*** *512K.* ***Copy protection:*** *Key disk.*



If you try designing letterhead or greeting card graphics using *MacPaint* or *MacDraw*, you may find yourself praying to the Hallmark deities. Hours of cutting and pasting often yield less than inspired results. *The Print Shop* by Brøderbund, however, lets amateurs assemble greeting cards, banners, letterheads, and signs with the help of a library of more than 135 borders and graphics. More proficient users can add their own home-baked drawings and digitized pictures using an ImageWriter II equipped with color ribbons or a LaserWriter with toner cartridges.

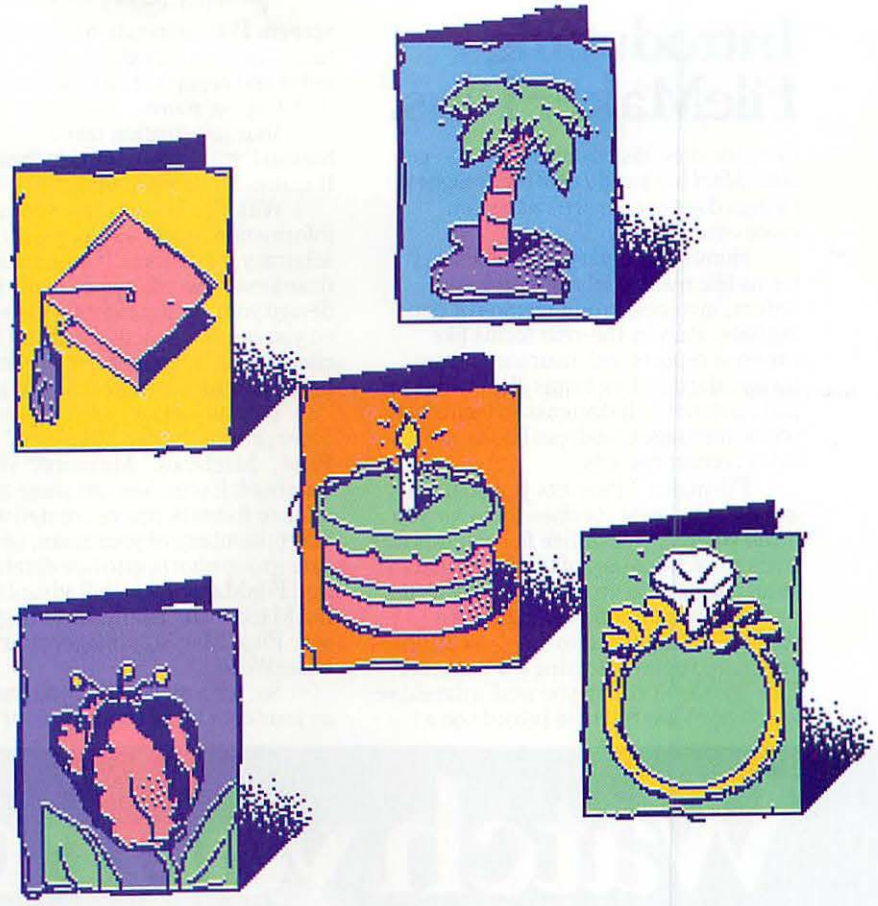
Your Own Hallmark

You begin your project in one of four project screens: Greeting Card, Letterhead, Banner, or Sign. Greeting Card, for example, gives you a blank card, which you toggle between Front and Inside. A dialog box lets you choose from a library of borders, graphics, and text, or you can pull down the graphics menu and load the small to full-panel graphics. You can insert text in 17 fonts, in point sizes from 9 to 72. The Sign project screen provides features similar to the Greeting Card; the Banner screen gives you a long horizontal display; and the Letterhead screen allows for top and bottom borders.

Each project screen permits you to preselect graphics—four small, four large, and one full-panel. You can select one of five fixed sizes for small graphics, one of two sizes for large graphics, and one full-panel size. As you'd expect, the large versions of the small graphics have poorer resolution, but you can refine them somewhat via the graphics editor.

The editor works like *MacPaint,* with four pointillistic paint brushes, an eraser, a pencil, a paint can, and 37 background fill patterns. There are also clever Tiled and Staggered features, which allow you to replicate your picture over the whole layout or combine any two of the four loaded graphics. Unfortunately, the workspace is smaller than a *MacPaint* window, since an image of the full page is also displayed on screen.

There's no ruler, and you have a limited palette of drawing tools (no forms, such as ovals, rectangles, and so forth). Although you can invert and flip graphics horizontally and vertically, you can't rotate them at odd angles. Furthermore, to import drawings you must use a size box, which distorts the drawings. You can export your letterhead with text and graphics into *MacWrite,* but *MacWrite* treats text as bit-mapped graphics, so you're unable to edit the exported text.



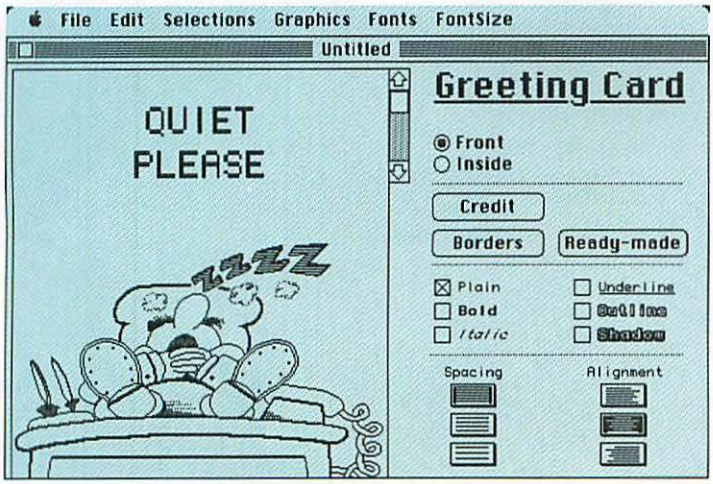
Constraints

Printing can be slow, especially in color. Using a 512K Mac and a hard disk, you can print a greeting card in approximately 1½ minutes with a LaserWriter or ImageWriter II (color printing takes 2 minutes). The color output was appealing, but the ImageWriter II doesn't mix colors evenly, and smeared lines appeared. This problem could be solved with a better printer, but *The Print Shop* can only be used with an Apple or a 100 percent ImageWriter-compatible printer.

Since the two program disks are packed, disk swapping is inevitable unless you have an external drive. Fortunately, the program includes a preloading feature, so that fonts, borders, and graphics can be loaded selectively, minimizing swaps. And although *The Print Shop* is *Switcher* compatible, it still takes up at least 300K of RAM, so it's possible to run out of memory on a 512K Mac if your System file is too large.

One minor irritation is that the Undo and OK commands are in different places on different screens. A major one, however, is that *The Print Shop* is not compatible with the Mac XL, despite the manual's claim.

Even with these drawbacks, Brøderbund has done a good job of combining predesigned projects and graphics with a workable editor. In fact, with more programs like these, the Mac could re-create a cottage industry. And if that happens, watch out, Hallmark.—*Mary Cadloni* □



Greeting Card
You can customize a ready-made card or design your own by typing a message and selecting a border style and graphics.

See *Where to Buy* for product details.

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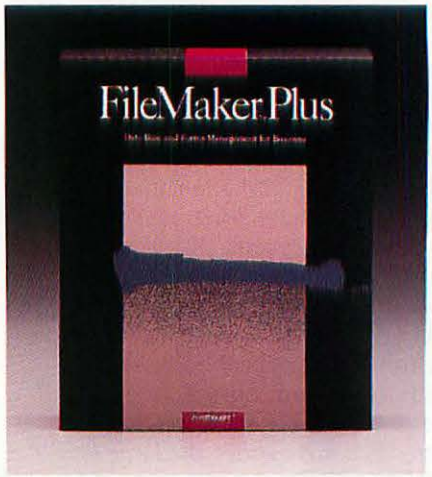
With FileMaker Plus, you can put information *in* any way you want, without arbitrary limitations. It automatically indexes every word, number and date. You design your output right on the screen, so you can see exactly what you (and your clients, staff, suppliers, publishers, board of directors) are going to get.

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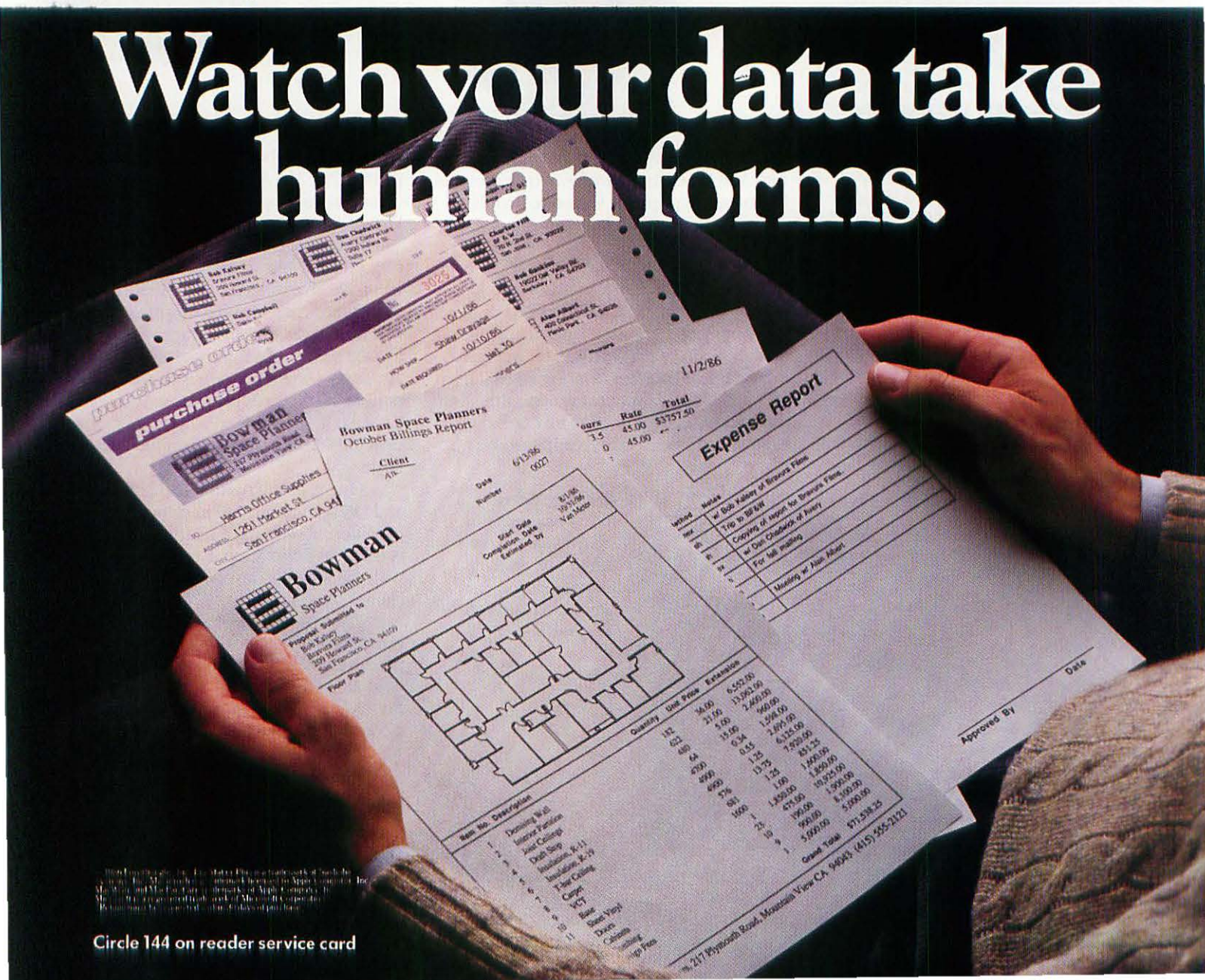
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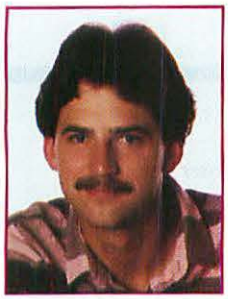
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Quick Tips

Answers to your questions

by Lon Poole

With some applications, what you see is not always what you print. This month I take a closer look at a couple of word processors that accurately display boldface characters. If you are worried about burning out the Mac's screen, you'll want to read about screen-saver utilities. And given the new round of hardware introductions from Apple, I will try to make it easier for you to identify a Mac's vintage. I also have two tips from readers—one that can help you recover from a potentially catastrophic bomb, and another for curing a paper-jammed printer.

Q Bold Spacing

Plain and bold text have identical spacing on LaserWriters, the difference being merely the thickness of the letters. On screen, however, bold text appears much wider than the same text in regular type. This affects word wraps and the number of lines in a paragraph. Is there any way to correct this problem?

Howard Upchurch
Garland, Texas

A The problem you describe occurs in *MacWrite* but not in *Microsoft Word* 1.05 or *WriteNow*. Bold text in *Microsoft Word* 1.05 is wider than plain text, both on screen and on the LaserWriter. Individual bold letters are wider on the screen than on the LaserWriter; *Word* 1.05 makes the printed bold lines wider by increasing the space between words.

WriteNow—and most other current-generation word processing applications, I imagine—correctly handles bold text destined for the LaserWriter. The Use Printer Spacing option in *WriteNow*'s Page Setup dialog box makes the screen spacing conform to the printer spacing, so that both bold and plain text occupy the same space on a line.

Q Screen Savers

I'm trying to find a utility that clears the screen after a user-specified period of inactivity, thereby protecting the screen. To bring back the screen, all you would do is touch a key or move the mouse. I know of such programs for the IBM; do you know of any for the Macintosh?

Peter Basha
Fort Collins, Colorado

A You can always dim the screen when you plan to leave the Mac on and unattended. Use the brightness control (located under the front overhang of a Mac Plus, Mac 512K, or Mac 128K) to darken the screen and reduce the chance of screen image etching. This manual method works, but lacks the elegance and reliability of an automatic control such as you describe.

Many desk-accessory programs dim the screen automatically. Most are available from public domain and shareware sources, such as user groups, on-line information services, and local electronic bulletin boards. Here are a few:

- *Autoblack* blacks out the screen after a period of mouse and keyboard inactivity. Normally this occurs after five minutes, but you can make it happen in two seconds by moving the pointer to the upper-right corner of the screen. You can also delay the screen save for two hours by moving the pointer to the lower right corner. As a reminder that the Mac is on, an analog clock (that is, a clock with hands) flashes about on the dark screen, showing the time of day.

Autoblack resides in the System Folder under the pseudonym *MacsBug* (it takes the place of the real MacsBug debugging utility, which can still be used by renaming it *Disassembler*). That trick fools the Mac into installing *Autoblack* automatically during start-up.

- *Gone Fishin'* is a desk accessory that temporarily turns the screen into a blackboard on which you can scrawl a message with mouse "chalk." This desk accessory has no timer; you must manually activate it.
- *Fade to Black,* as its name suggests, slowly dissolves to a black screen with the icon of the current application floating about on it. You set the time interval between the most recent user activity and the start of the fade-out.
- *Blank,* a desk accessory, blacks out the screen after a specified number of minutes and seconds. A small white square flashes at random locations while the screen is black. *Blank* optionally installs and activates itself when you start up. It does not work with the MiniFinder. *Blank* is part of the commercial product *Top Desk* from Cortland Computer, P.O. Box 9916, Berkeley, CA 94709.

Q BASIC Rounding

When using Microsoft BASIC, I would like to be able to round the result of a calculation from 6.432654321 to 6.4 or 6.43. I can't seem to do it with the FIX, INT, CDBL, CINT, or CSNG functions.

Maxwell J. Richards
Smithtown, New York

A Rounding is based on a simple formula. Using your numbers as examples, the formula

```
INT(6.432654321*100+0.5)/100
```

equals 6.43, and the formula

```
INT(6.432654321*10+0.5)/10
```

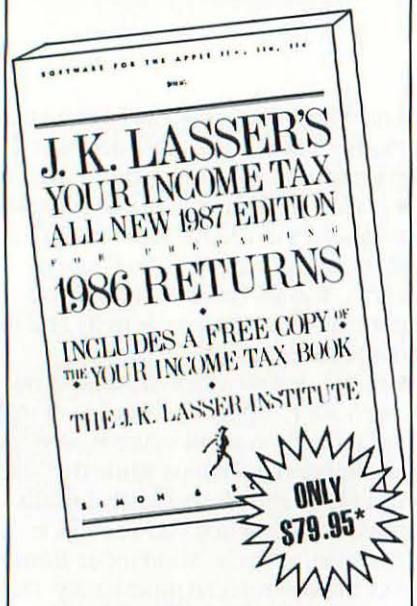
equals 6.4. You can concoct your own rounding function using the INT function in a DEF FN statement like this:

```
DEF FNROUND(value,places)=
INT(value*10^places+0.5)/10^places
```

You would use this user-defined function to round your number to one decimal place with the expression

(continues)

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LaserWriter to Mac

Mac Plus Mini-Circular 8	Mac 512K DB-9	Mac XL DB-25	Signal	LaserWriter DB-9	Signal
4	3	1	GND	3	GND
6	4	20	TXD+	8	RXD+
3	5	2	TXD−	9	RXD−
8	8	9	RXD+	4	TXD+
5	9	3	RXD−	5	TXD−

LaserWriter to Mac

You can connect a Mac directly to a LaserWriter without using AppleTalk connectors. Construct a cable wired as shown here. Be sure to use fully shielded cable in order to avoid an FCC class B violation. Data transfer occurs at a very high rate and is not attenuated by AppleTalk connection boxes.

FNROUND(6.432654321,1)
and to two decimal places with the expression
FNROUND(6.432654321,2)

Q Macintosh ID

I would like to know if there are any bytes in the Mac's ROM whose contents uniquely indentify a logic board, like a serial number.

José Menchaca Benito
Concepcion, Chile

A According to Macintosh Technical Note #37 (published by Apple Computer), it is possible to determine whether your application is running on a Macintosh Plus or a Macintosh 128K/512K logic board. Check the low-memory global HWCfgFlags at memory location $B22. Bit 15 is 1 only if the SCSI port is present. This is the method the 128K ROM uses to distinguish Mac Plus logic boards. Macintosh Technical Notes are available from the Apple Programmer's and Developer's Association (APDA), 290 S.W. 43rd St., Renton, WA 98055, 206/251-6548.

You can tell if the machine you're using has the 128K Mac Plus-type ROM by inspecting ROM85 at memory location $28E. If the value at this location is $7FFF, the 128K ROM is present; if it is $FFFF, you're dealing with the 64K ROM. To determine the ROM version number, use the Environs procedure as described on page 236 of *Inside Macintosh, Volume IV*. Or check the word 8 bytes beyond the beginning of ROM, as specified by global variable ROMbase at location $2AE. This word has the format $xxFF for the Macintosh XL and $00xx for the Macintosh Plus, 128K, 512K, and 512K Enhanced; xx is the ROM version number. The original 64K ROM number is $69 and the 128K ROM number in the Mac Plus is $75.

Q LaserWriter sans AppleTalk

Can a LaserWriter be cabled directly to a Mac Plus without using AppleTalk? If so, where can I get a wiring diagram? I have talked to people at several computer stores and at Apple. They all say "I don't know," or "It can't be done; you have to use AppleTalk." I simply can't believe it.

Ron Hamako
Cupertino, California

A Apple Technical Communications says it *can* be done. Use the Macintosh Peripheral Cable, Apple part number M0185. Connect the cable's 9-pin end to the LaserWriter, and the mini-8 connector to the Macintosh Plus printer port. If you had a 512K Mac, you could use a Macintosh Plus Adapter Cable, Apple part number M0189, to adapt the Macintosh Peripheral Cable to the 9-pin printer connector on your computer. If you'd rather build your own cable, the necessary pin connections are shown in the table "LaserWriter to Mac."

Set the LaserWriter's mode switch for "AppleTalk." Select the AppleTalk Con-

(continues)

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Editor's Choice-PC Magazine

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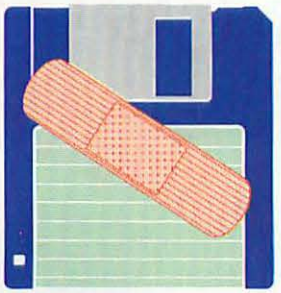
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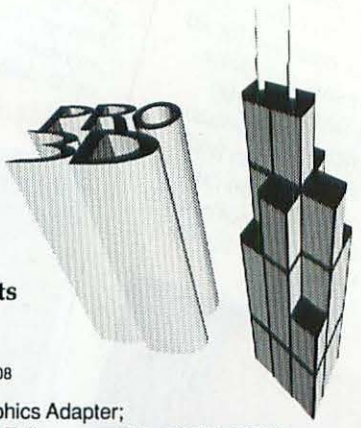
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nected option in the Control Panel desk accessory, and choose the LaserWriter with the Chooser desk accessory.

Q Elephantine Desktop File
I have a 512K Mac with a non-Apple 1-megabyte upgrade and an Apple Hard Disk 20 (disk-port version). I recently installed System 3.2 and Finder 5.3 on the hard disk. Since then, the start-up time has increased considerably. It now takes 68 seconds to get to the desktop! What am I doing wrong?

Dennis Montecillo
New York, New York

A Sounds like the invisible Desktop file the Finder uses to keep track of your desktop organization has assumed pachyderm proportions. In fact, New York City may be in danger unless you act fast. A normal Desktop file on a 20-megabyte hard disk will easily take up 80K to 100K, but for reasons still shrouded in mystery, the file can suddenly become enormous. I was badly frightened two weeks ago by a 4-megabyte Desktop file on my hard disk. Alien!

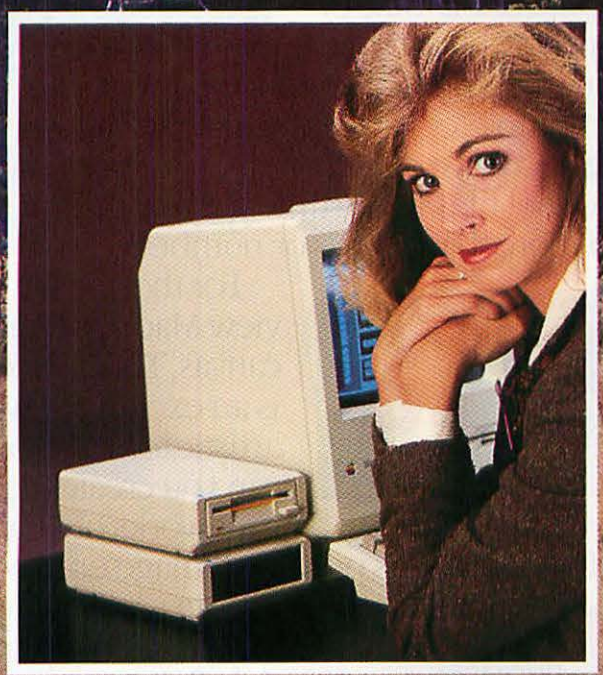
You can rebuild the Desktop file by holding down the Option and ⌘ keys when you start up or when you quit an application. A dialog box asks whether you want the desktop rebuilt. Answer OK to put the Desktop file on a crash diet. One warning: you will loose any comments recorded with the Finder's Get Info command if you do rebuild the desktop.

Your hard disk may be inefficiently organized if it is nearly full and you have frequently added and removed files. In that case, an individual file cannot be written in one area of the disk. Instead, it must be scattered across the disk surface. You can reorganize your hard disk by backing it up, erasing it, and restoring it from the backup. This process rebuilds the desktop as well. You can save some time by using a disk reorganization program like *Disk Express* from AlSoft, although you must still back up completely in case a power interruption or error wipes out your hard disk during reorganization.

Foil ImageWriter Feedback
Tip: Paper left in an ImageWriter for even a few minutes acquires a stubborn curl that tends to feed back into the printer when printing begins, jamming the paper

(continues)

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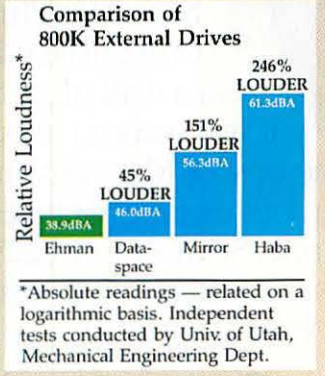


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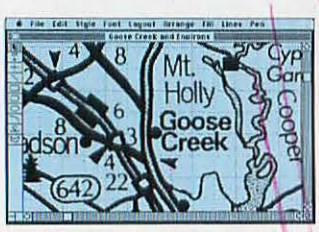
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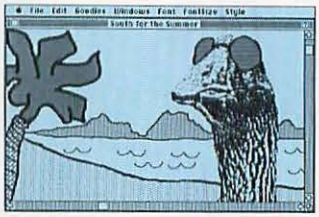


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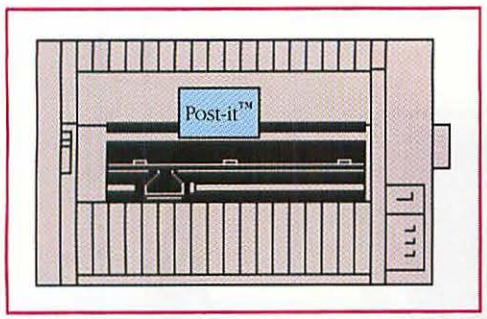
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Circle 167 on reader service card



End Printer Jams

A Post-It note on the top spacer of an ImageWriter I, directly behind the platen, keeps paper from curling back into the printer and doesn't interfere with normal printer operation.

around the platen. You can prevent this mess with a Post-It note (see "End Printer Jams"). Because the Post-It is on the top spacer, it does not interfere with removing or installing the cover or with loading or removing paper. The paper coming out of the printer just glides across the bridge created by the Post-It, rather than curling back into the machine.

Stuart M. Kurtzer
Springfield, New Jersey

This Post-It note trick works with the ImageWriter I but not the ImageWriter II. You can eliminate paper curl altogether on either model by rolling the paper back just until the printer's Paper Out light comes on. At that point, the paper is clear of the platen's curling-iron influence. When you're ready to print again, roll the paper forward to its standard starting position.

System Error Recovery

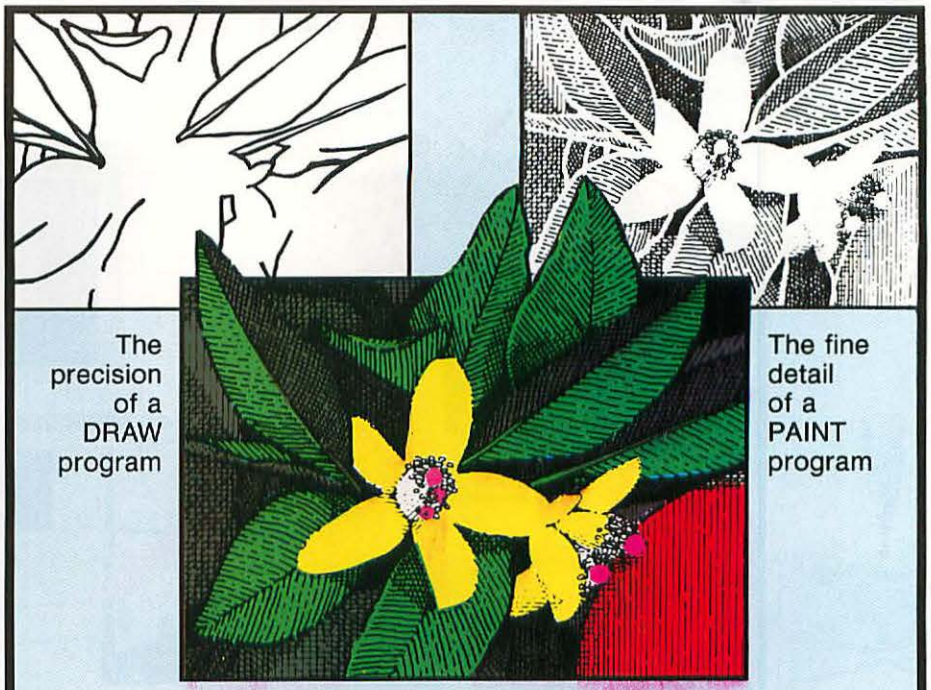
Tip: When you get a system error, there's always a Resume button, but it's rarely activated. You can activate the Resume button by installing the *CrashFix* desk accessory and choosing it from the Apple menu each time you start an application. On a Mac Plus, you may be able to return to the Finder with any RAM disk or disk cache intact, even if you didn't install *CrashFix*.

When the Mac Plus crashes, press the Interrupt switch (*not* the Reset switch). You'll see a dialog box with nothing but the greater-than symbol, >.

Follow these steps:

1. Type SM FA700 A9F4 and press Return. A bunch of characters will appear in the dialog box, with the symbol > at the top.

(continues)



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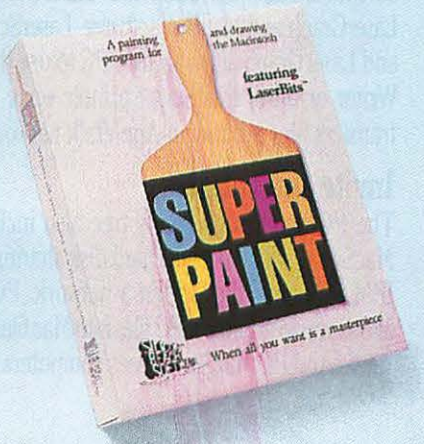
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(compared to other paint programs) "SuperPaint is the clear winner and... MacPaint's heir apparent."
Adrian Mello, MacWorld, Jan '87

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Bob LeVitus, MACazine, Jan '87

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Sharon Aker, MacUser, Feb '87

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System Requirements:
Macintosh 512K, Plus, XL (1 mb)

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MARRIAGE OF CONVENIENCE

PC MacBridge weds Macintoshes and IBM PCs for a complete office network

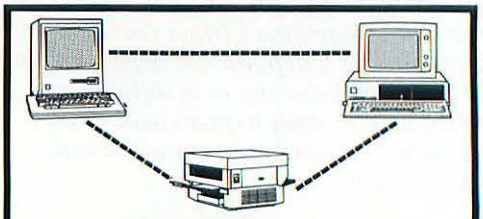
For too long, Macintoshes and PCs have been feuding like the Hatfields and McCoys, unwilling to even acknowledge each other's existence. But now, with PC MacBridge as matchmaker, the two are brought together in a network where they can love, cherish, and share files and printers with each other.

All in the family

PC MacBridge Plus is a family of products that enable Macintoshes and IBM PCs to share information and peripherals within an AppleTalk network. PC MacBridge Plus includes a PC half-card with network software. Also included are LaserScript/Plus, LaserGraph and MailBox software. LaserScript/Plus and LaserGraph allow an IBM PC to use the LaserWriter or other PostScript printer while MailBox transfers files around an AppleTalk network.

Invite the relatives

The PC MacBridge family tree also includes PC MacServe,* which permits hard disk sharing by both IBM PCs and Macs within a network. PC MacTxt allows you to transform PC files into Mac files and vice versa. And PC MacSpool frees computers for other tasks during any print job.



PC MacBridge puts IBM PCs into the AppleTalk network for a lasting engagement.

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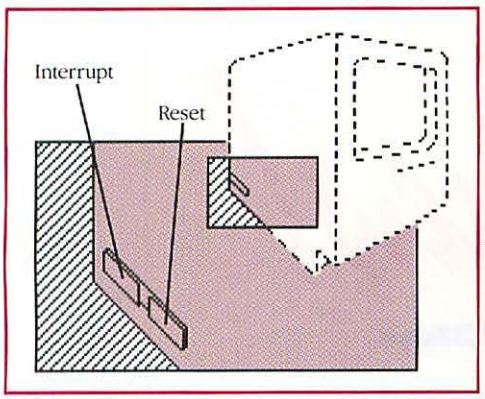
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Interrupt Switch
You may be able to return to the Finder with your RAM disk, disk cache, and equanimity intact after a system error. Press the Interrupt switch and type the three commands SM FA700 A9F4, PC FA700, and G.

2. Type PC FA700 and press Return. The command will disappear but the dialog box should otherwise be unchanged.

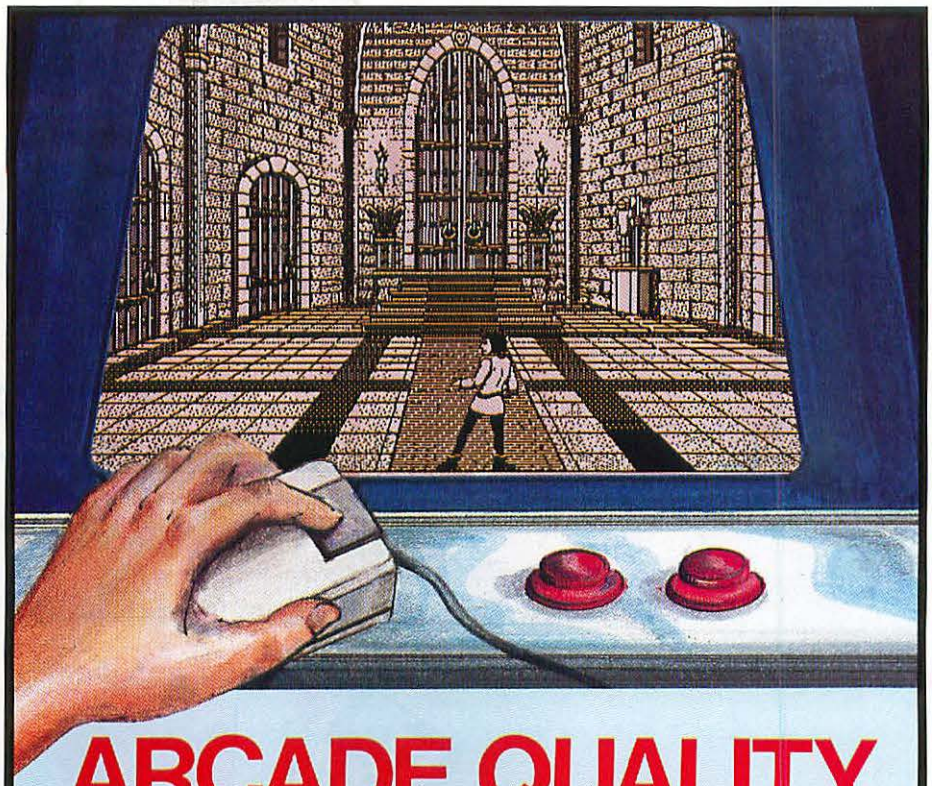
3. Type G and press Return.

If you want to know how this works, step 1 puts the value A9F4, which is the code for the trap ExitToShell, at memory location FA700, the start of screen memory on the Mac Plus. Step 2 sets the program counter at memory location FA700. Step 3 executes the instruction at the current program counter location.

Bob Duys
Antwerp, Belgium

The Interrupt switch is the rearmost part of the optional two-part programmer's switch that can be installed on the left side of the Mac Plus, near the bottom rear corner (see "Interrupt Switch"). Be careful not to press the Reset switch, which is the frontmost part of the programmer's switch, or you'll restart the Mac. The CrashFix *desk accessory is available from user groups and on-line information services. This tip and* CrashFix *both work about half the time. The other half of the time I get endless system errors and must restart—but half is better than none.*

Send tips or questions to Quick Tips, Macworld, *501 Second St. #600, San Francisco, CA 94107. Send electronic mail to CompuServe 70370,702 or The Source BCW440. All published submissions become the property of* Macworld. □



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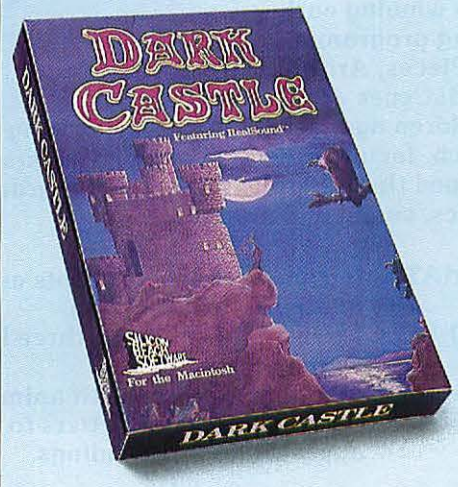
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Suggested Retail Price: $49.95

System Requirements:
Macintosh 512K, Plus

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Getting Started with Telecommunications

What telecommunications is, what it offers, and what you need to go on line

by Jim Heid

You process your share of words, dabble in databases, and occasionally ask "what if?" of a spreadsheet. You're interested in desktop publishing (who isn't?) and graphics applications. But if you're like most Macintosh users, you haven't toyed with telecommunications—that strange world of modems, passwords, and protocols.

And why should you? What's at the other end of a phone line that could interest you and your Mac? You'll discover there's quite a bit actually, once you know how to get to it. This month, I'll introduce you to the world of telecommunications, spotlighting the most popular applications and explaining how to get on line. Next month, I'll look more closely at communications gear and at some of the technical details of telecommunicating.

One Computer to Another

Literally any phone conversation qualifies as *telecommunications,* since the term means "communicating at a distance." In computer parlance, however, telecommunications refers to telephone communications between computers. If you've ever had to wait in a store while a credit card validator reaches its verdict, you've experienced one of the less-enjoyable telecommunications applications.

Schools and corporations use telecommunications to enable students and employees to tap into large mainframe computers using *terminals*—keyboards and video monitors or printers with built-in communications hardware—attached to the big machines through phone lines or other wiring. Once, such terminals represented an individual's only access to computing power. But now personal computers have changed that; by using communications hardware and *terminal emulation* software, they've replaced terminals in many places.

The personal computer revolution caused a corresponding upwelling in the communications world, leading to the proliferation of new applications and communications companies, and prophecies of a day when you could learn, correspond, bank, shop, and swap by phone. That day hasn't arrived, partly because the refinement and widespread acceptance of a technology always take longer than its birth, but mostly because you can't endorse a check, go on a field trip, or try on clothes over the phone.

Information at Your Service

While it may be some time before we all, like the cartoon Jetson family, have terminals in our homes, telecommunications has much to offer us today. The key players that make it so appealing are *information services* like CompuServe, The Source, Dow Jones News/Retrieval Service, Delphi,

(continues)



MAX SEABAUGH

and GEnie. They're high-tech hybrids of a library, a shopping district, and a meeting hall; a subscription to one can keep you and your phone line busy for years.

Information services are built around rows of mainframe computers that divide their time among the subscribers who access them, giving each person the illusion of being the only one using the service. During peak usage periods, the system's response slows and the illusion fades somewhat, but generally you can get what you want when you want it.

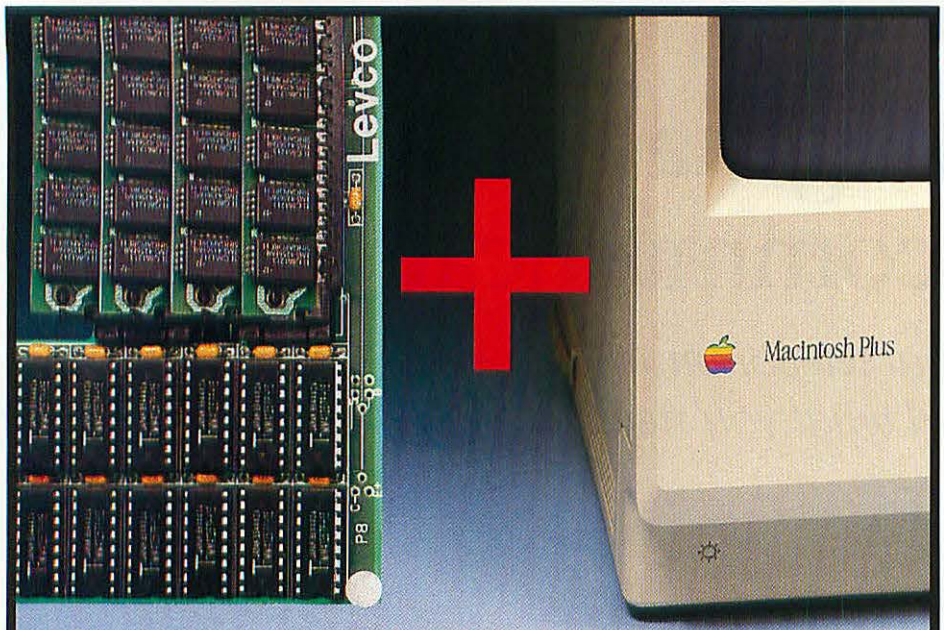
Once you have the right equipment, you gain access to an information service by paying an initial fee, which buys you a *user ID* that identifies you, and a *password* that lets you into the service. Thereafter you're billed monthly for the time you spend on line. Membership fees range from $25 to more than $100 for specialized services, although most communications-related products come with discount offers that reduce or eliminate the initial fee and give you an hour or two of free connect time. Connect-time fees vary depending on the service and the time of day you call, but they usually range between $5 and $25 per hour.

In metropolitan areas, accessing an information service usually involves making a local call to a *switching network* such as GTE Telenet or Tymnet, which acts as a relay between you and the service. (From nonurban locations, you have to make a toll call to the closest city served by a switching network.) You call the network's local *node,* type a code for the information service you want, and the network connects you. You'll incur a small per-minute surcharge while you're communicating, but it's almost always less than a long-distance call to the service's headquarters.

What They Offer

Not surprisingly, an information service's primary commodity is information. Most provide access to up-to-the-minute news from the wire services: Associated Press or United Press International. Dow Jones News/Retrieval Service offers highlights from *The Wall Street Journal.* NewsNet sells access to hundreds of specialized business and government newsletters and journals. With most services, you locate items of interest by typing *search phrases.* Many services also let you create *clipping folders:* sets of search phrases the service uses to automatically set aside stories that interest you.

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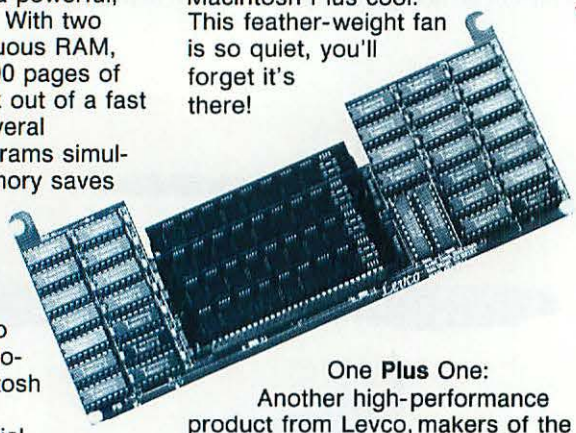


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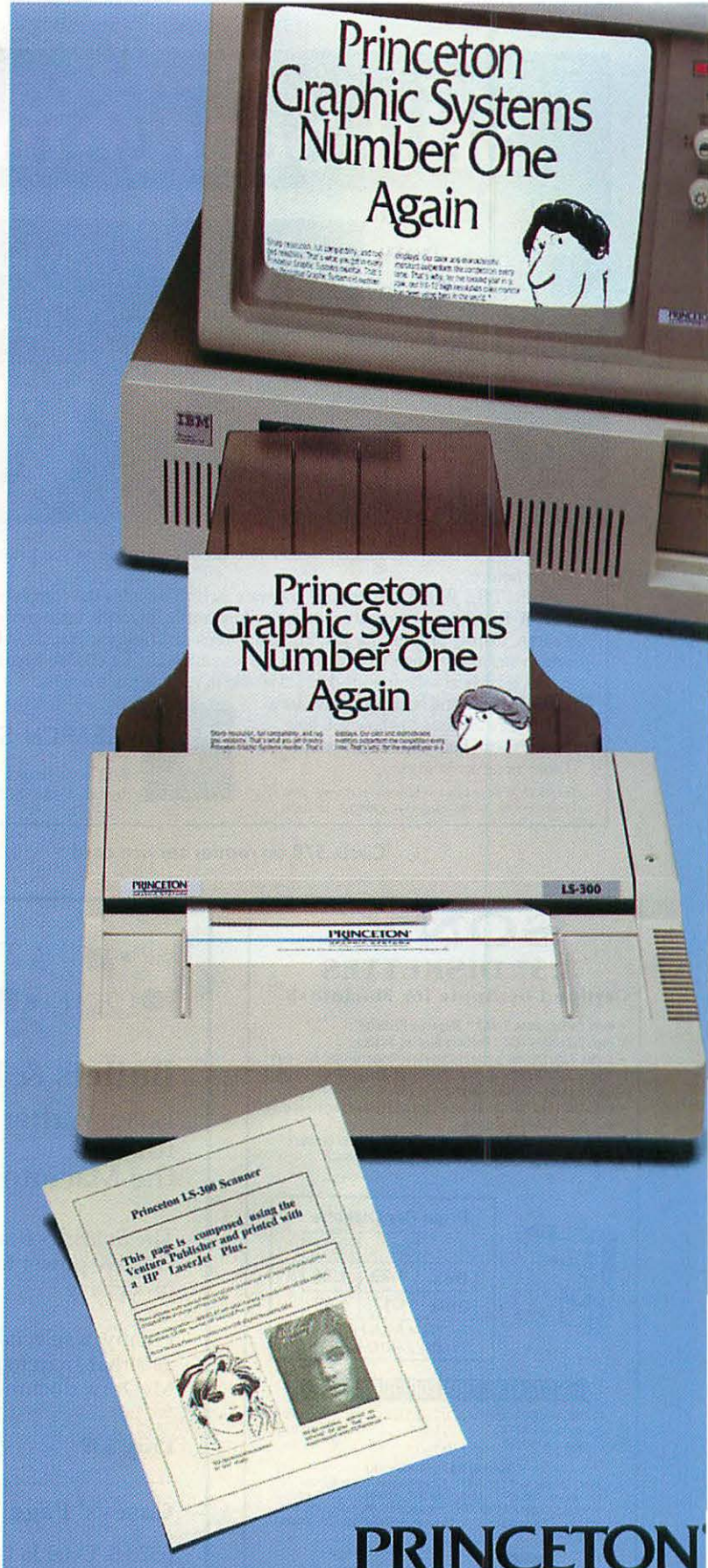
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Also available is an "SCSI" interface Mac Scan* for the Apple MacIntosh. You can scan, edit and store a variety of Mac desktop publishing applications — MacPaint, MacWrite, Pagemaker, ReadySetGo!, Ragtime and Just Text — and print on your Apple LaserWriter.

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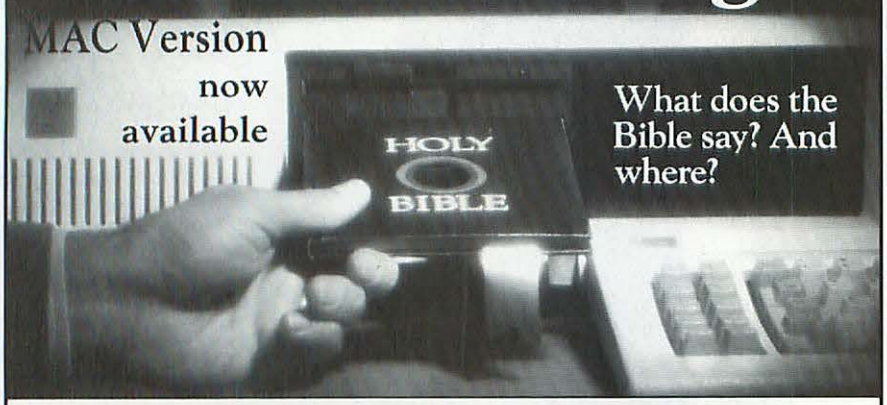
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In addition to the daily news, many services offer specialized information like CompuServe's Disclosure II, which contains information on over nine thousand publicly held companies. Researchers and students can pore through on-line editions of encyclopedias, such as the ten-million-word *Grolier's Academic American Encyclopedia,* which is available on several services.

Another popular service is electronic mail (*E-mail*), which lets you correspond over phone lines. Companies with offices in different cities can use E-mail to relay reports faster and at lower cost than telegrams or express couriers. Of course, you must remember to sign on and check your electronic mailbox periodically; E-mail loses its timeliness when it sits unread. E-mail's major drawback is that you can only use it to correspond with other subscribers. However, one service, MCI Mail, lets you compose letters that are subsequently printed (on your letterhead, with a laser-printed replica of your signature, if you like) and delivered overnight.

Frequent travelers may appreciate access to the Official Airlines Guide (OAG), the same flight-listing service used by travel agents. Available on most information services, OAG lets you type your departure and arrival dates and cities, then view a list of flights, times, and prices. You can even find out if food is served on a given flight.

If you're still recovering from holiday shopping crowds, the discount shopping services that most information services offer might appeal to you. CompuServe carries the shopping metaphor to its suburban limits. Its Electronic Mall offers everything but acres of asphalt and socializing teenagers, counting among its merchants Waldenbooks, Bloomingdale's, and Sears. Find an item you want, and a command charges it to your credit card.

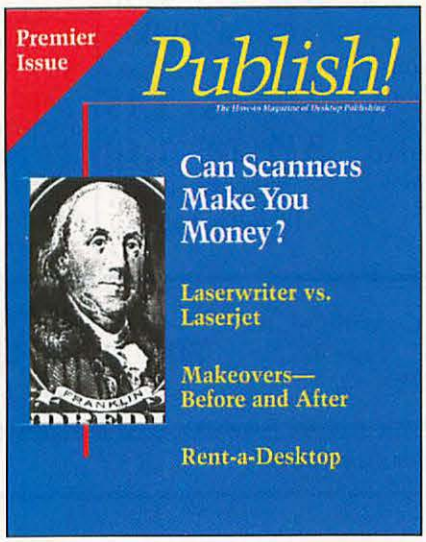
Perhaps the most lively branches of an information service are its special interest groups (SIGs). As sort of an on-line clubhouse, a SIG allows subscribers with common interests—ranging from computers to human sexuality to tropical fish—to exchange ideas and information. Computer SIGs such as the MicroNet Apple User's Group (MAUG) on CompuServe also offer megabytes of member-supplied software, *MacPaint* graphics, fonts, and more data that you can transfer to your own disks, or *download.* Many items are free; others are

(continues)

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distributed as *shareware*—you pay a modest fee for a product only after you decide to keep it (see "Gems from the Public Domain," *Macworld,* August 1986, and "The Problem with Shareware" in this issue). MAUG has evolved into one of the most active and elaborate SIGs on CompuServe, with special forums for Macintosh developers and frequent, real-time conferences with Apple employees and industry experts.

Other Ways to Communicate

Telecommunications doesn't have to mean accessing big-time information services. Also available are *bulletin board systems* (BBS), homespun exchanges built around a personal computer rather than a row of mainframes. Many bulletin boards are run by computer clubs for their members; others are operated by hardware and software manufacturers or dedicated hobbyists. A bulletin board lacks the wide-open spaces of a major information service, but it also lacks a connect-time charge; in most cases, access costs only the price of your phone call.

Finally, you can communicate by calling another communications-equipped computer directly. The technicalities of such connections can be difficult to iron out initially, but once they're resolved, you can exchange files without going through the intermediary step of accessing an information service or bulletin board.

The Modulating Factor

How often must you communicate, and what do you need to do it? Aside from a telephone line, you need a *modem,* which attaches between the Mac's modem port and a telephone jack, and translates, or *modulates,* the Mac's internal language of ones and zeros into the tones that phone lines carry. At the other end of the wire, another modem *demodulates* the tones back into bits and bytes. (The term *modem* is derived from *mo*dulate and *demo*dulate.) You also need a communications program, which shepherds data to and from the modem and provides commands for sending and receiving files, printing incoming text, and saving it on disk.

While you can spend almost $1000 for the Mercedes of modems, the Hayes Smartmodem 2400, between $150 and $300 will buy a unit that will satisfy all but the most ardent communicators. Communications software ranges from a $40 shareware fee for the remarkably capable, ever-

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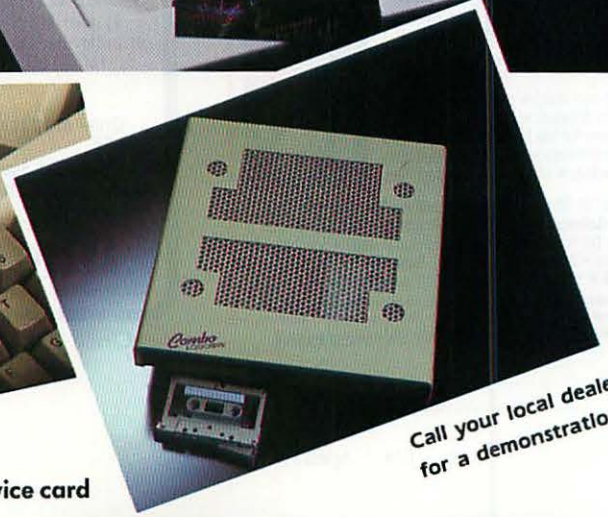
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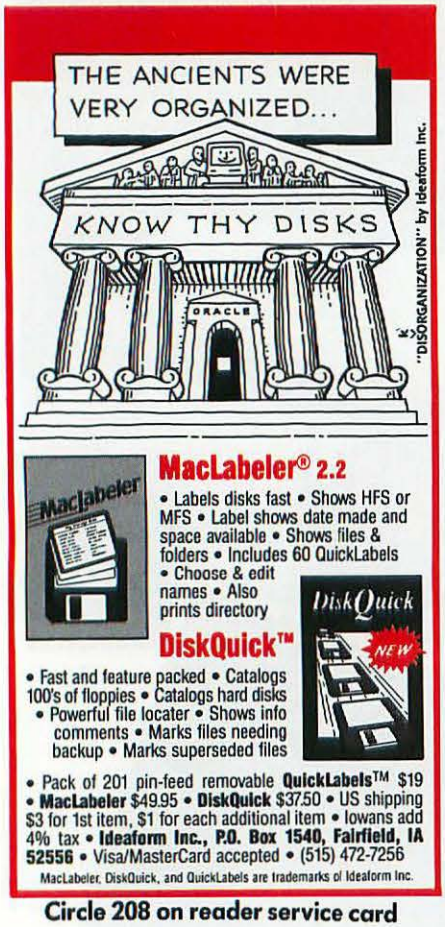
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evolving *Red Ryder* to $149 for Hayes's easy-to-use *Smartcom II*. Packages that combine a modem and software are also available, such as Prometheus Products' Promodem (see "More than a Modem," *Macware Reviews, Macworld,* April 1986). Often the software half of such teams is weak, although Hayes's Smartmodem-and-*Smartcom II* package is an exception.

Next month's *Getting Started* will examine some factors to consider before buying a modem and communications program. For reviews of some communications programs, see "No Static at All," *Macworld,* December 1985, and "Grab that Microphone," *Macware Reviews, Macworld,* July 1986.

Not a Pretty Interface

For all its benefits, there is an ugly side to telecommunications–especially for Macintosh users, who are spoiled by the Mac's easy operating style and sharp, attractive screen displays. Signing on to an information service is like taking a trip back in time to the way computers used to work; forget pull-down menus, dialog boxes, and pointing and clicking. Because information services must be accessible from any brand of computer or terminal (which may have a typewriter instead of a video screen), they lack graphics and instead require typed commands, many of which seem to have been designed by cryptologists.

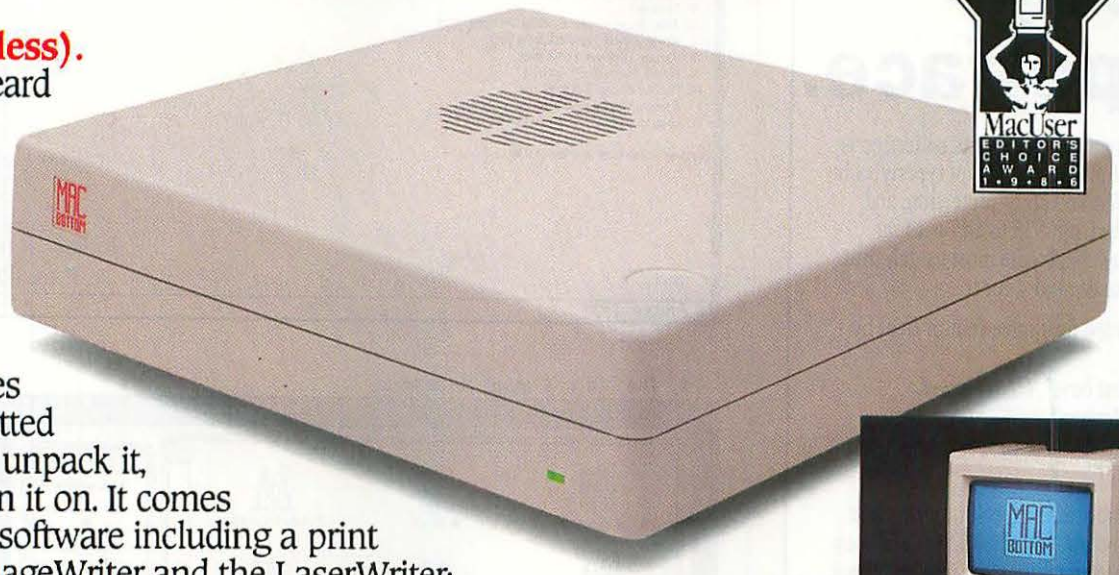
In fact, because information services can't tell whether you're using a video screen or a typewriter terminal, their text-editing facilities for creating E-mail are rather primitive–you must work on a line-by-line basis, which means no word wrap-around, no use of cursor keys, no selecting text with the mouse. For this reason, prolific silicon correspondents create their communiqués with their favorite word processor, save them in text-only form, then simply *upload* the files when they're on line. This approach saves connect time, too.

You navigate through most information services by typing commands in response to menus that list services and options. Many services also have an *expert mode* that dispenses with menus and presents a simple prompt, such as "Command?" Memorizing the commands you need can be difficult, but the incentive is there: waiting for menus and their help screens to appear hinders the process, and in telecommunications, time is money.

(continues)

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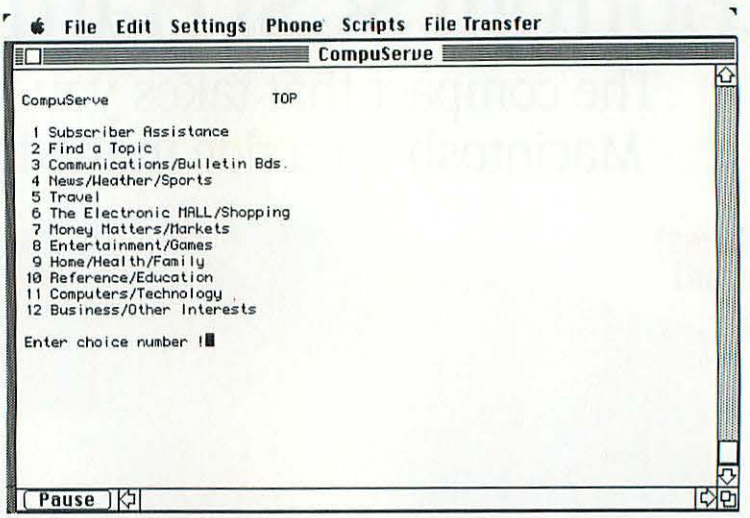
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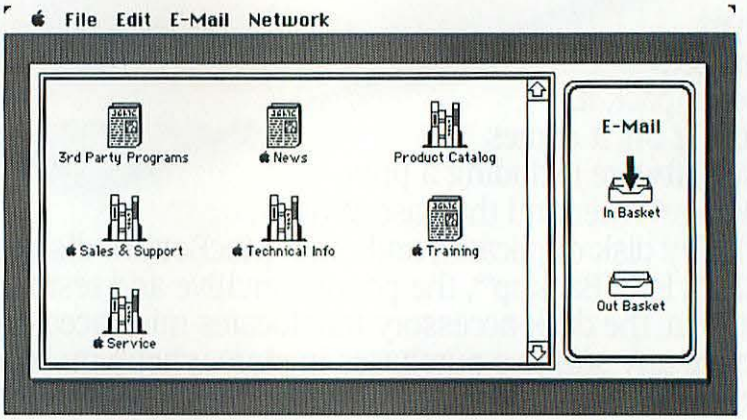
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Communications Two Ways
Compare CompuServe's main menu, typical of the all-text interfaces used by on-line services, with the main menu of AppleLink, Apple Computer's corporate network for employees and dealers. It may be a while before the average user can find software that allows point-and-click navigation of commercial on-line services, but that day is coming.

Pointing Ahead

Fortunately, the future of telecommunications looks a bit more attractive, and before long you'll be able to point-and-click your way through much of a communications session. Most major information services are developing ways to add graphic user interfaces to their systems while maintaining brand independence. One promising technology uses a system of pattern matching; your communications program recognizes certain screens as they're received, then creates a dialog box that lets you make selections, which your program translates into the text commands the service requires. Such an approach allows the information service—the *host*—to remain oblivious to the brand of computer with which it's communicating.

Another way of working graphics into the picture is to have the host send commands to transform your communications program into a more familiar format that uses, for example, a set of pull-down menus or a desktoplike display with icons representing the service's offerings. Apple's *AppleLink* dealer and employee communications service uses this approach now (see "The Telecom Link," *Macworld*, May 1986).

This route requires that both the host and the communications program know what they're talking to, so only users with a certain computer and communications package can use the service. Because an information service couldn't switch to this approach without alienating subscribers who lack the right equipment, compromise may be the answer: when you sign on, the service could quickly query your communications program to see if it understands graphics commands. If not, the service would use conventional text menus.

But until such graphic user interfaces become available, telecommunicators are stuck with old-fashioned prompts, ugly screen displays, and typed commands. Combine these drawbacks with the technicalities of communicating and it isn't surprising that most people still (and will continue to) rely on newspapers, express couriers, and local shopping centers. □

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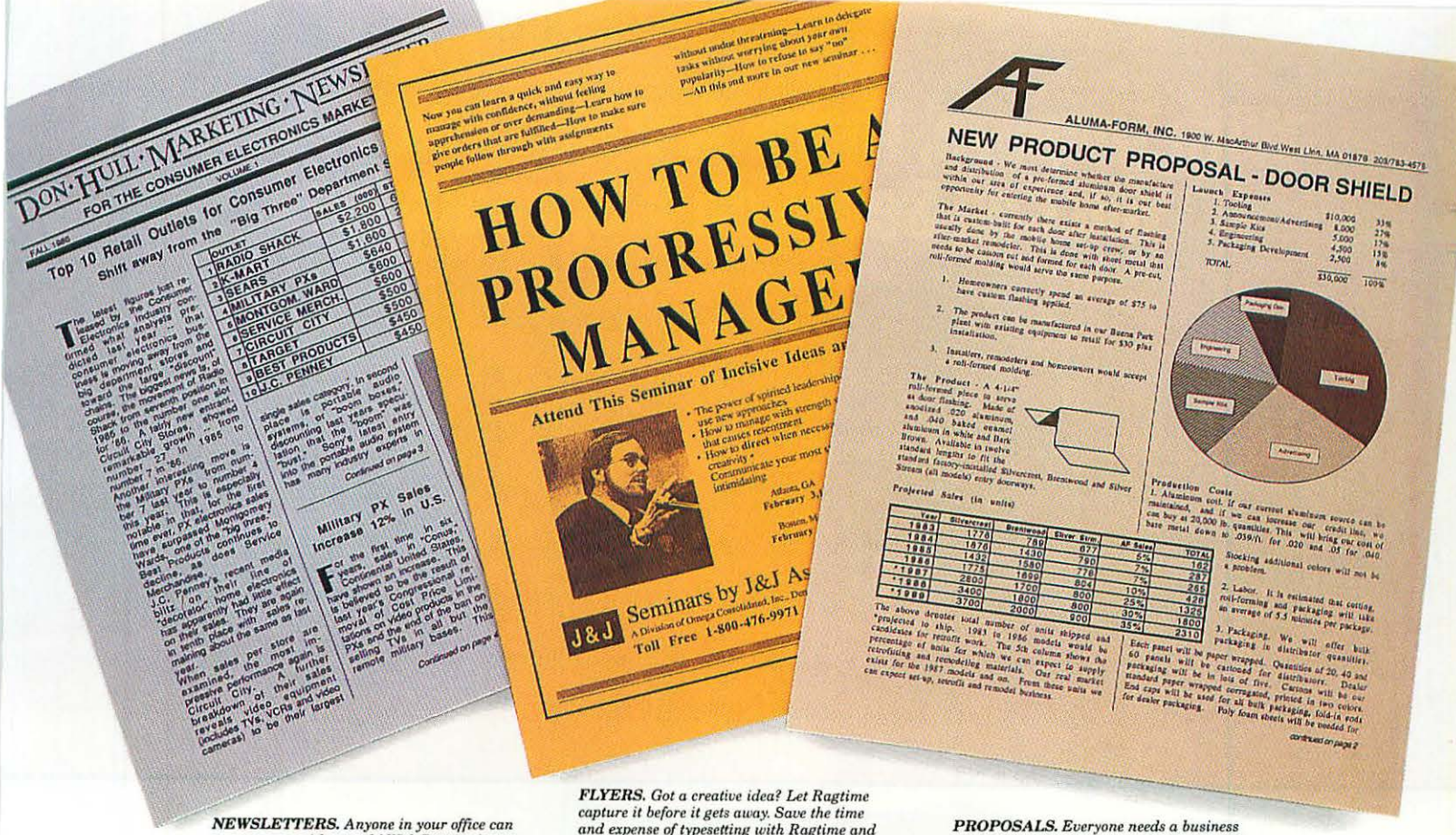
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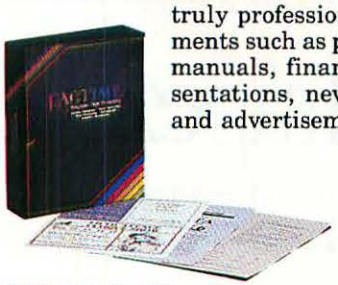
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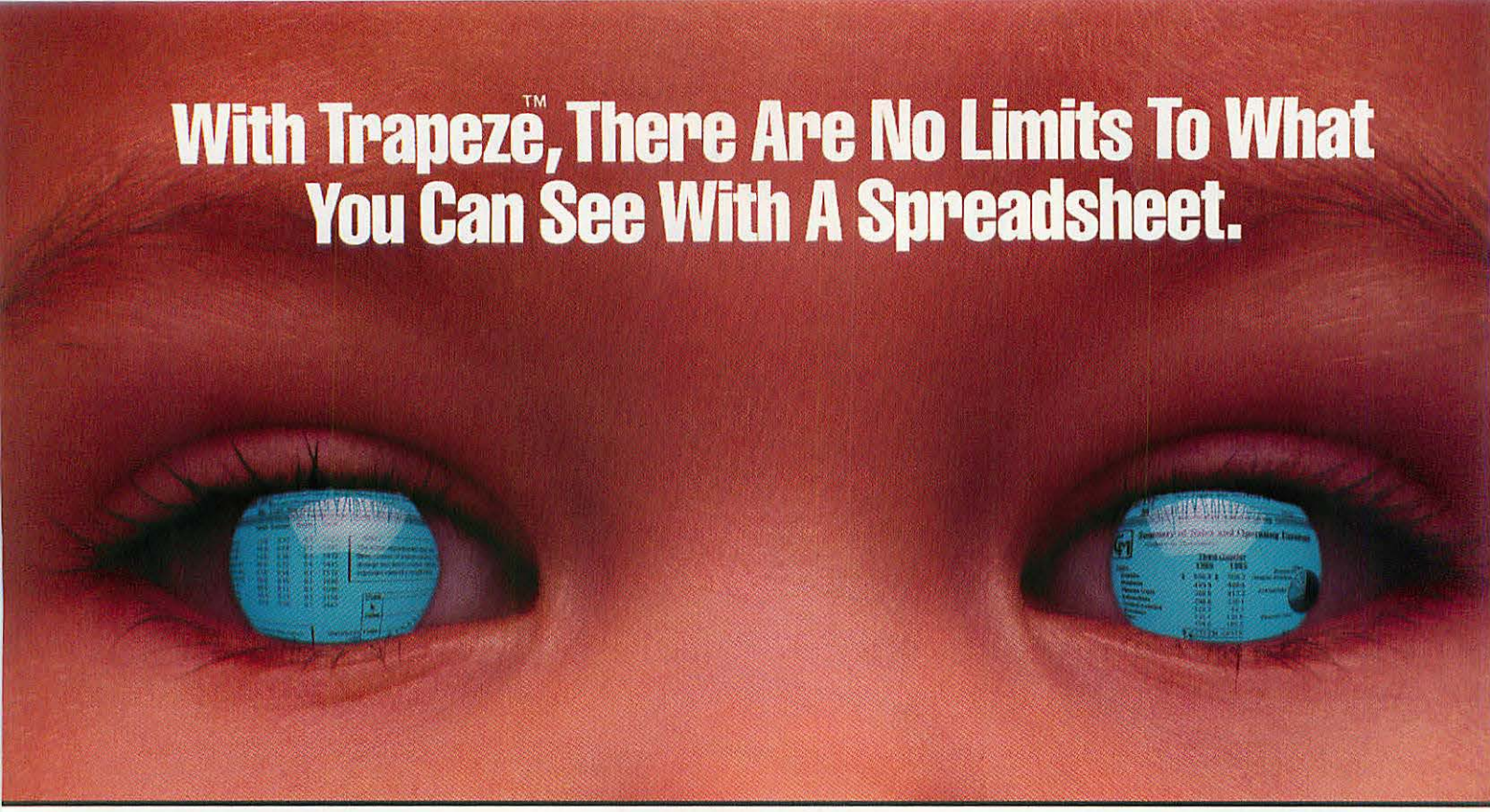
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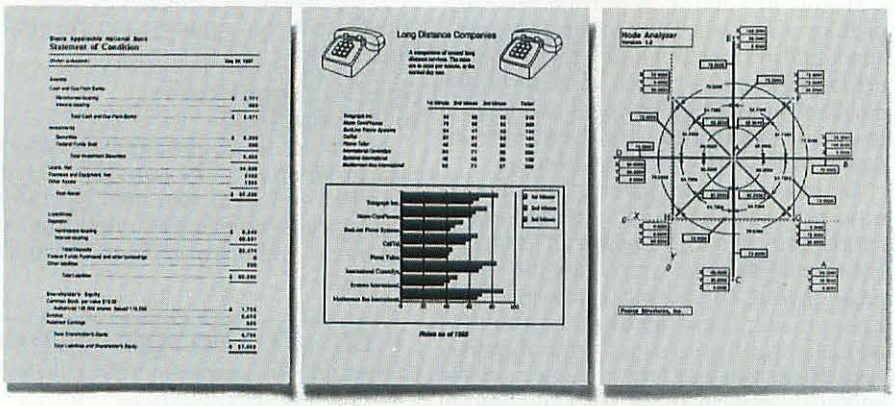


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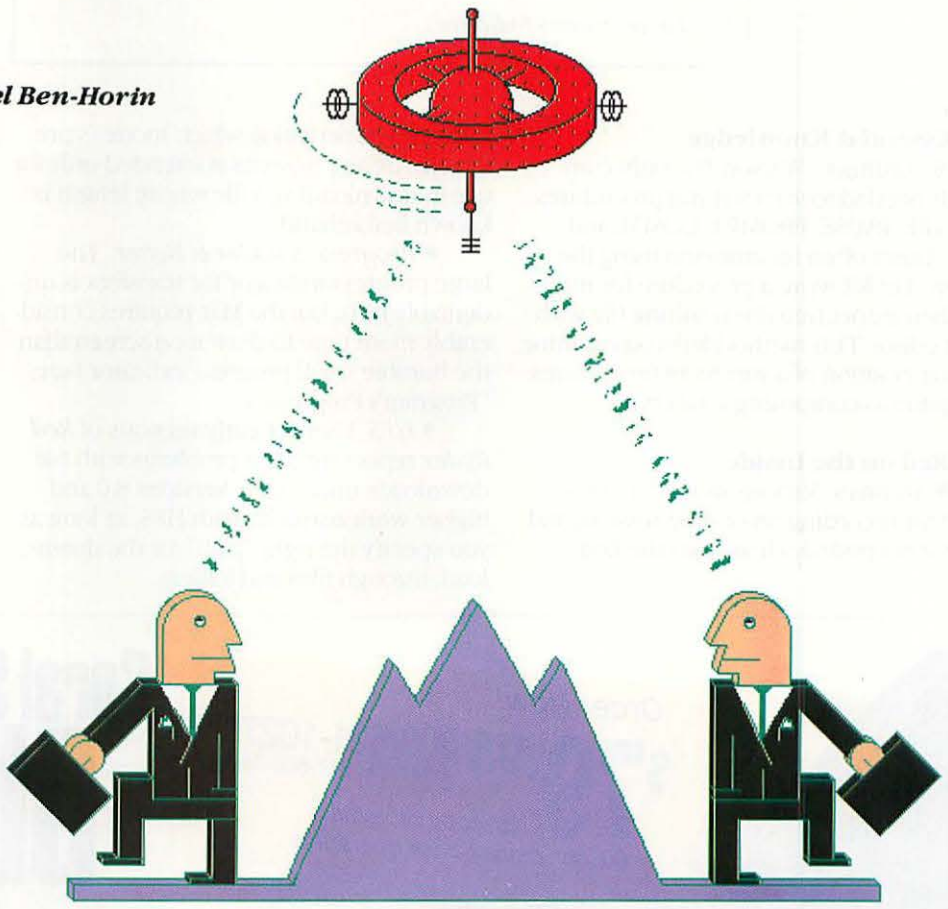
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Insights on Red Ryder

Inside information on the Mac's hottest communications program

by Charles Seiter and Daniel Ben-Horin



JOHN HERSEY

Throughout its rapid sequence of incarnations, *Red Ryder* has continuously maintained its position as the most popular piece of communications software for the Mac. Yet you'll never see it on the shelf at the local computer shop or appearing on best-seller lists, because the program reaches users through shareware channels. To appreciate this remarkable accomplishment, try to envision a universe in which the leading IBM PC business database, for example, is distributed on bulletin boards by an individual programmer. *Red Ryder* is currently managed by one person, Scott Watson, who continues to distribute the program with great enthusiasm and intensity. Often, it seems, the best software springs from one person's vision (the original design of Pascal is a good example).

Update and Be Straight

According to Watson, most operations in *Red Ryder* version 10.0 work nearly 100 percent faster than in version 9.4, which was in turn 80 percent faster than version 8.0. Nevertheless, many users still slog away on version 6.5, and occasional holdouts remain in the low 4s. Many Ryders limp along with only 3 percent of the program's functions because they were handed a copy without the documentation files.

Let me make a serious suggestion. On a few occasions in your life, you will have a chance to participate in a noble quest and do yourself some immediate, practical good. Whether out of altruism or self-interest, send Scott Watson $40 and become a registered user, enjoying solid and friendly documentation, the latest version of the program, and technical support from the man himself. Version 10.0 is simultaneously simpler and more powerful than its predecessors, and to keep advanced users from getting bored, the irrepressible Mr. Watson has included nearly one hundred undocumented procedures to explore in the new version.

If you have an old version of *Red Ryder,* you may not be able to tell from the information on disk how Watson distributes new upgrades. These days, each paid-for copy of *Red Ryder* provides the owner with a GEnie account, and Watson regularly posts new versions of the program in the Red Ryder Forum there.

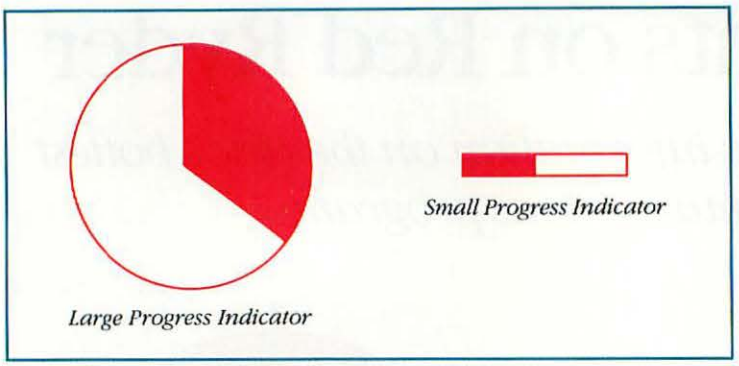
Being a Good Host

The most frequently asked question at *Red Ryder* customer service is, "How do I get my system as host to recognize incoming calls?"

This question arises because the program is the most popular bulletin-board host system in current operation. For the original Mac 9-pin DIN serial port and 25-pin modem (of the Hayes type or earlier) the answer is to tie together the modem-input handshake and carrier-detect lines (these go to pin 2 on the Mac). For variant modem configurations, the best approach is to post your hardware question on the Red Ryder Host session of the Ryder forum on GEnie, and hope that the wizened pros who work this session have already seen a case like yours.

(continues)

Program's Progress
The large progress indicator, which marks the progress of a file transfer, takes more time to be drawn on the Mac screen. Use the small indicator to speed up transfers.



Essential Knowledge

According to Watson, the only commands needed to start writing procedures are TYPE, PAUSE, PROMPT, COMM, and DIAL. Users often recommend using the option "Let RR write a procedure for me" and then inspecting the resulting file with a text editor. This method lets you examine the composition of a variety of procedures as a guide to composing your own.

Red on the Inside

• *Archives* Various modes are provided for recording an on-line session, and it is not necessarily clear from the *Red Ryder* documentation which mode is preferred. Archive Screens is intended only for use in downloading a file whose length is known beforehand.

• *Progress: Smaller Is Better* The large progress indicator for transfers is undeniably nifty, but the Mac requires considerably more time to draw it on screen than the humble small progress indicator (see "Program's Progress").

• *HFS* Users of early versions of *Red Ryder* report frequent problems with file downloads under HFS. Versions 8.0 and higher work correctly with HFS, as long as you specify the right "path" for the download, through files and folders.

• *An Excellent Application* A prime business application of communications software is automatic downloading of financial data into a spreadsheet; many Ryders will want to load data into *Microsoft Excel*. Using *Tempo* along with the communications program and the spreadsheet, you can set up your Mac to hook up automatically to an on-line information service, download preselected data, and enter it into a spreadsheet. "Going On-Line with Excel," in the July 1986 *Macworld*, gives detailed instructions for using this technique to update an *Excel* stock-portfolio valuation spreadsheet while you sleep.

• *Successful Transfers* Sometimes you log on to a bulletin board and seem to be able to communicate with no problems (at least the screen isn't hash), but file transfers don't work properly. This may occur because the host machine is using a parity that differs from the N or E typical in the personal computer world. Many IBM mainframes require *Mark* as the parity designation, and there are plenty of IBM mainframe hosts out there.

(continues)



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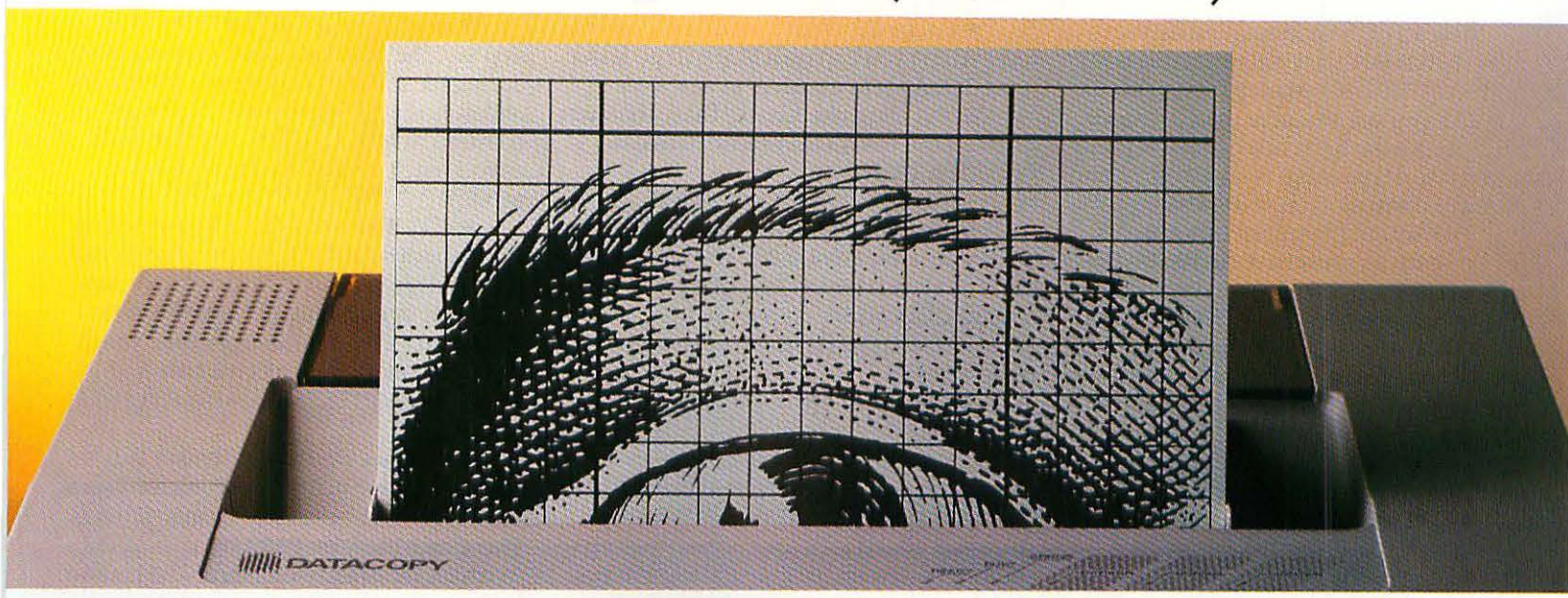
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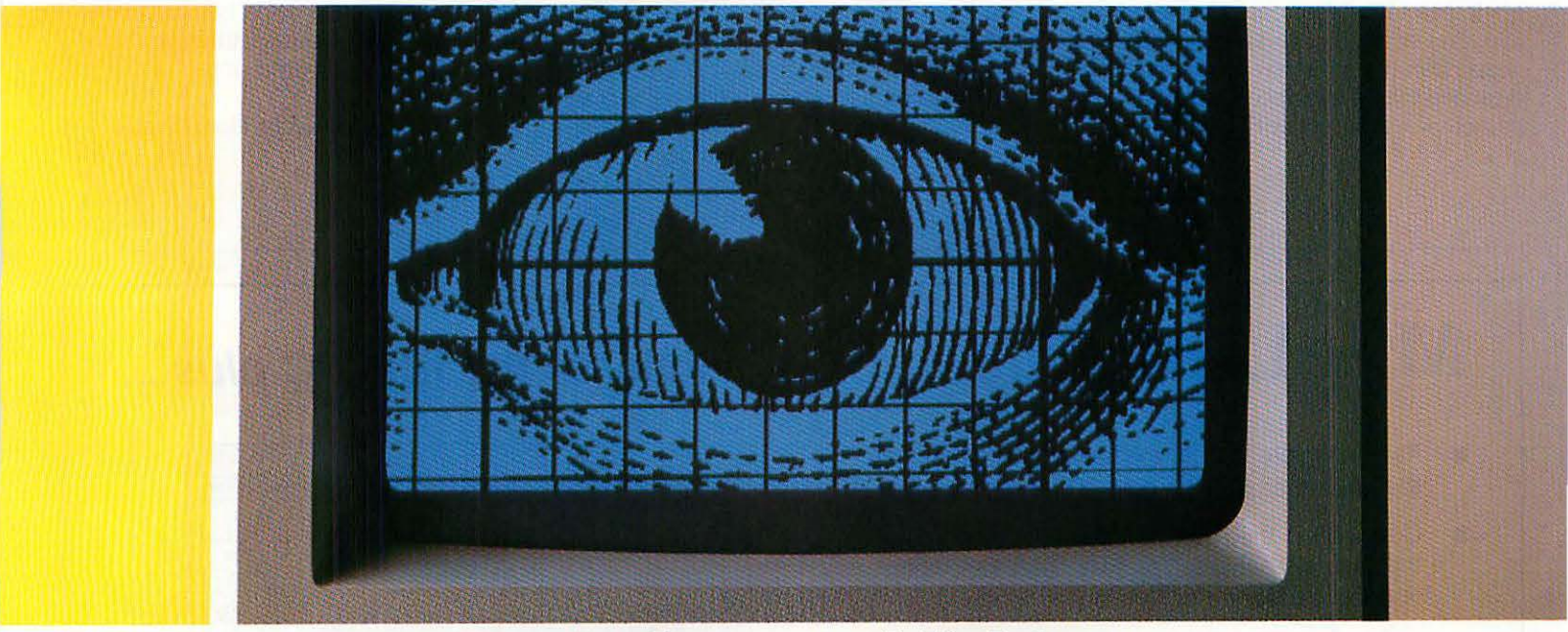
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Instead of the communications settings (baud)-8-N-1, try either (baud)-8-K-1 or (baud)-7-K-2. K = Mark parity is simply statistically more frequent than S = Space parity, so it's the first choice, but if K parity doesn't work and there is no way to obtain further information on your host, try S.

The Kermit file-transfer protocol is very popular in university circles. It's distributed in the public domain by a group at Columbia University, and well-maintained Kermit software resides on nearly every academic mainframe. If your host is a university computer, and for some reason your Xmodem file transfers aren't working, you can improve your chances of success by trying a Kermit transfer instead.

• *Caught in the Net* Many users complain about *Red Ryder* file transfers on Telenet; the problems typically happen in Xmodem download attempts. An evaluation of possible solutions concludes that no consistently successful scheme exists for getting around the timing considerations in packet switching. The only solution is to get version 10.0, which was completely redesigned expressly to accommodate packet-switching networks.

• *Cache 22* With a 68020 processor, everything you run on a Mac will go faster except Xmodem transfers in *Red Ryder,* which will hang like a horse thief. You must turn off the instruction cache to make Xmodem work.

More New Improvements

The latest *Red Ryder* is so recent that its fans haven't had much chance to exchange discoveries on line. So here are a few new features you might miss without road signs.

• *The Big Picture* The screens in *Red Ryder* 10.0 are superficially similar to those in earlier versions, but with a little mouse experimentation you will find that they can be sized, dragged, and stacked. This feature was added to accommodate the capabilities of new large-screen Mac monitors (it's been extensively tested with the Radius Full Page Display). On a large screen, a three-way split is a practical way to show windows with incoming, outgoing, and currently edited files all at once.

• *Status* The Status Bar at the top of the 10.0 screen looks the same, but it now contains pull-down menus. Instead of toggling through a series of baud rates, for example, you can select the correct rate with a single click.

• *More Time for the Puzzle!* In version 10.0 the desk accessories are enabled during file transfer. This means, for the resolutely businesslike, that you can begin editing a Notepad answer to your E-mail as you watch it scroll past in a separate window.

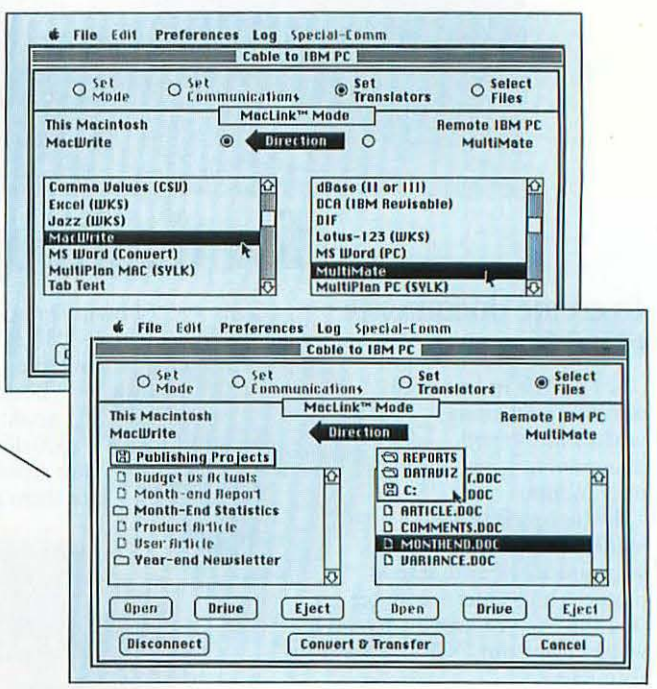
• *If X, Why Not Y?* The Ymodem protocol now available for file transfers in 10.0 is basically a version of Xmodem that supports transfers of multiple files with a single command. Unlike *Microphone,* which supports Ymodem in receive-only, *Red Ryder* allows its use for both sending and receiving.

• *Ultimate Mysteries* Version 10.0 contains a great many undocumented commands that can be used to change settings. These take the form PARAM *xxx address,* in which *xxx* stands for a three-digit number corresponding to a setting value and *address* is where the setting variable is stored. For the moment, if you want to use these mystery commands, be prepared to experiment, since the documentation for them is not yet prepared. □

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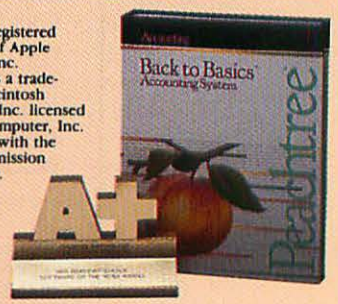
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Mac Desktop Tools

More goes on behind your desktop than meets the eye

by Tom Saxton

When you work on your Mac's desktop—moving files around, opening applications, and throwing away old files—you are actually running the Finder, a collection of programs and routines fundamental to the machine's operation. (For introductory material on the Finder, see "The Compleat Disk Juggler" and "Clean Up Your Electronic Desktop," *Macworld,* May/June 1984, and "Getting Started with the Mac System," November 1986.) Although the Finder is as typical a Mac program as any, many tricks for using it efficiently are easily overlooked. Some, in fact, are rather well hidden.

As with most Mac programs, the Finder has evolved since its introduction. Features have been added that make it faster and easier to use. The newer Finders take advantage of the improved Macintosh hardware; they also include new features such as the Shut Down command and the Hierarchical File System (HFS), which simplifies working with a hard disk. To make a long story short, if you are using an original Mac, you should have Finder version 4.1 (and System 2.0). If you are using a Mac with more than 128K of RAM or with the 128K ROM, you should use Finder version 5.3 (or higher) and System version 3.2 (or higher).

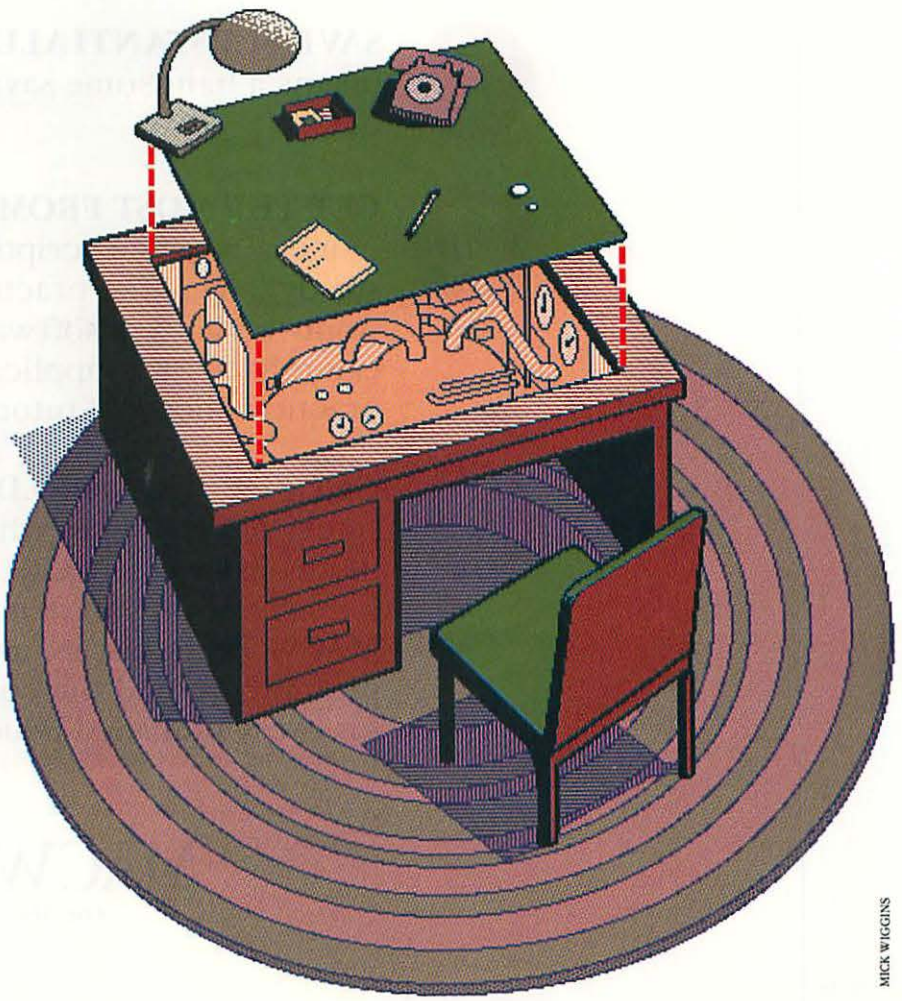
To determine which Finder you have, select About the Finder from the Apple menu. A window appears that contains the version number of the Finder that is running. If the version you are using is relatively recent, it also shows how much RAM your machine has. With Finder version 5.0 or later, if the Mac has the 128K ROM, a period follows the RAM size; if that period does not appear, the Mac has the old 64K ROM. Also, the Trash Can icon tells you something about the Finder: in version 5.0 or later, the dots at the top and bottom of the can's vertical ribs point to the left; in earlier versions they point to the right.

You may update to the correct version of the Finder and System files by copying them from a disk that has them (for Finder 4.1) or by running the Installer program on the *System Installation* disk available from Apple dealers, bulletin boards, and user groups.

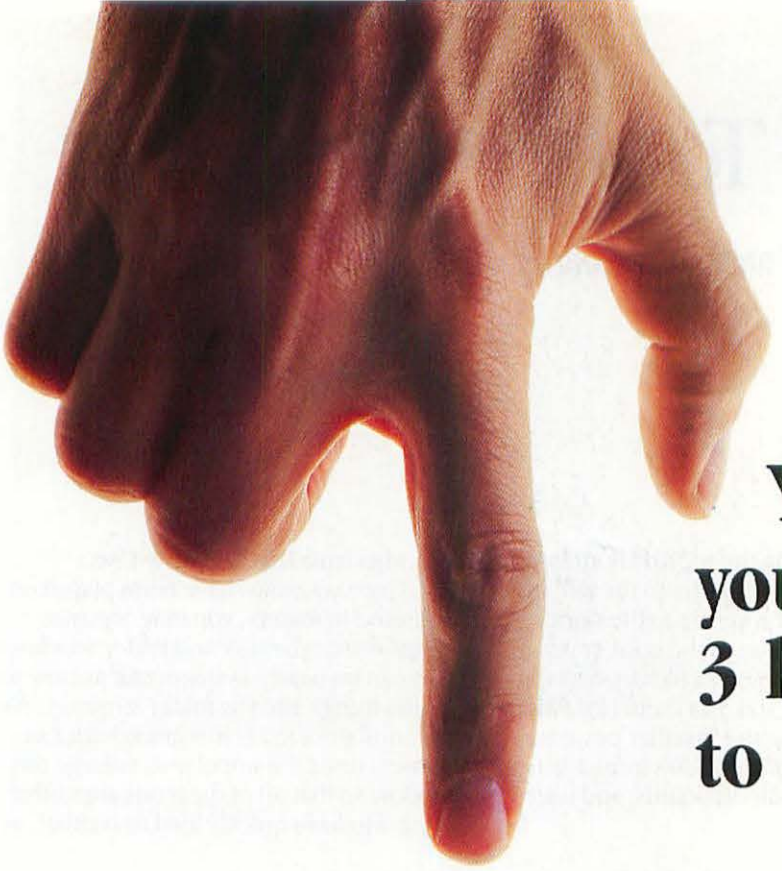
Maximizing Window Use

Once your files have been placed on disks and in folders, you may organize things within the disk and folder windows. This can be nearly as important as how you shuffle things into the folder structure. As the number of icons in a given folder increases, resist the impulse to enlarge the window so that all of the icons are visible. Large windows quickly lead to conflict, as

(continues)



MICK WIGGINS



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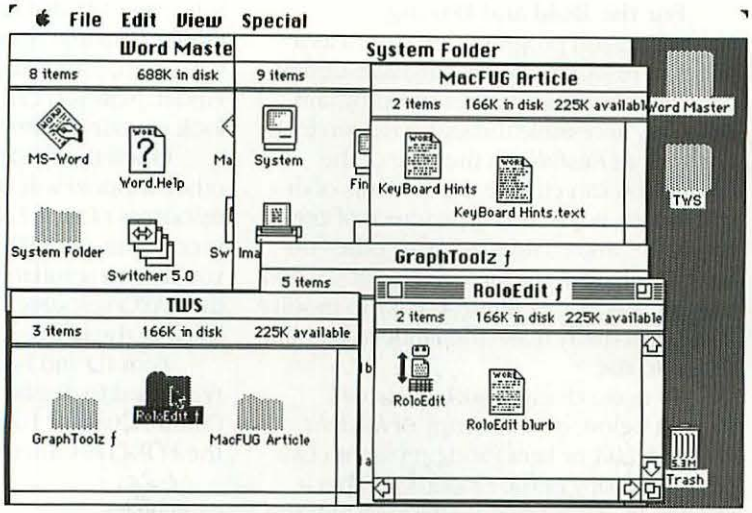
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Root-Level Windows *Establishing a system for window placement avoids confusion on the desktop. The author's arrangement: a small window at the upper left for application disks, data-disk windows underneath; folders from the data disk open on the right half, with icons uncovered at the far right.*

you will inevitably want to look into several folders simultaneously. Here are some tricks to avoiding window conflicts.

To reduce desktop clutter, develop a "window philosophy." My disks tend to fall into two categories: application disks and data disks. I think of the Mac screen as being divided into four equal squares. (I consider the area on the right, where the disk icons appear, to be off-limits for windows.) I place the windows to my application disks in the upper-left corner of the screen and keep them as small as possible. Data-disk windows usually occupy the lower-left corner. Folders from my data disks then open up into the remaining quarters on the right side of the screen (see "Root-Level Windows").

Since I seldom use the System Folder in each of my application disks, I don't bother making it accessible in the window. I make the window just large enough to select and open the applications I need and scroll the System Folder off the edge. If there are two folders I frequently want open at the same time, I put their windows in different corners.

Moving Background Windows

To move a window without activating it, hold down the ⌘ key and drag the window's title bar. This works in most applications and desk accessories, in addition to the Finder. (For more tips on organizing your desktop, see "Order out of Chaos," *Macworld,* May 1986.)

If your Mac has the new ROM, clicking in the zoom box in the upper-right corner of a window expands the window to full size, for quick access to its contents. When you finish with the window, click the zoom box again, and the window returns to its original size. This way you get a full view of a packed folder without messing up your neatly arranged folder windows.

Secret Options

Holding down the Option key during some operations gives you a variation on the operation. For instance, holding down the Option key while selecting Clean Up from the Special menu arranges scattered icons in the active window in neat rows and columns, instead of just moving them to the nearest grid point.

Under the HFS if you hold down the Option key when you select an icon, and then drag the icon to the Trash, you avoid the dialog box that asks, "Are you sure you want to throw that away?"

To initialize a single-sided disk with the HFS format, hold down the Option key when you select One-Sided from the initialization (or Erase Disk) dialog box, and hold it down until the initialization is complete. If you want to copy an entire 400K HFS disk onto another 400K disk and retain the HFS structure, drag the source-disk icon onto the destination-disk icon, and then hold down the Option key when you answer "Yes" to the dialog box. Hold the key down until the Files/Folders Remaining to Copy message appears. (To use the HFS on a Mac with the old 64K ROM, the Hard Disk 20 file must be in the System Folder.) To create an 800K Macintosh File System (MFS) disk, start up your Mac with System 2.0 and Finder 4.1, and initialize, or erase, your double-sided disk. If you have the 128K ROM, this is about the only use you should ever have for the older System and Finder.

Two more HFS shortcuts: holding down the Option key when you click on the close box of a window causes all windows to close. Holding down the Option key when you double-click on a disk or folder icon makes the window open as usual. But note that the Finder will forget that the window was open next time you use the disk.

If you have installed the MiniFinder and want to return to the Finder, hold down the Option key when you quit your application.

More Tips

We all develop habits when we work with the Mac, and some of them take more time than they need to. Here are a few shortcuts that save time during routine tasks.

- *Changing Finders* To change start-up disks without restarting the Mac, open the System Folder on the new disk, hold down the ⌘ and Option keys, and double-click on the Finder. When you return to the Finder, throw the former start-up disk into the Trash. If you hold down the Option key when opening an application, the disk containing the application becomes the start-up disk.
- *RAM Caching* To speed up returning to the Finder, set the RAM cache to at least 64K.
- *Finder of Lost Icons* Occasionally, one icon gets stacked on top of another. If an icon seems to have disappeared, a Clean Up will uncover it.
- *Shutting Down* When you want to turn off the Mac, or you need to restart, use the Shut Down command from the Special menu. It's faster than ejecting your floppies and turning off the Mac's power, and it cleans up the floppies before ejecting them, which makes the Mac start up more quickly the next time you use those disks.
- *Tab to Find Disk* In the Standard File dialog box, if the Drive button is dimmed so you can't switch disks, press the Tab key to prompt the Mac to recognize the other disk.
- *Naming Files* In the Standard File dialog box, files show up alphabetically. If you want a particular file to appear on the list ahead of other files, put a period or a numeral at the beginning of the file name. This is a handy trick when there are many files in the same folder, or when using an MFS disk.

(continues)

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For the Bold and Daring

Macintosh programs are stored as a series of resources. Many language-dependent and cosmetic features of a program are easily accessible through a resource editor such as *ResEdit*. In the case of the Finder, you can change the contents of dialog boxes, adjust the appearance of certain icons, and customize many other details. The Layout resource of Finder version 5.0 and later, for example, is easy to modify and can actually make the Finder faster and easier to use.

To make changes such as those I suggest below, obtain a copy of *ResEdit* (version 1.0.1 or later) and prepare an expendable copy of the Finder for experimentation. After opening *ResEdit*, find the window for the Finder's disk. The window lists every file that has resources. Select the Finder item and open it. A new window will open, listing all the resources in the Finder. Now you can begin changing the look of your desktop.

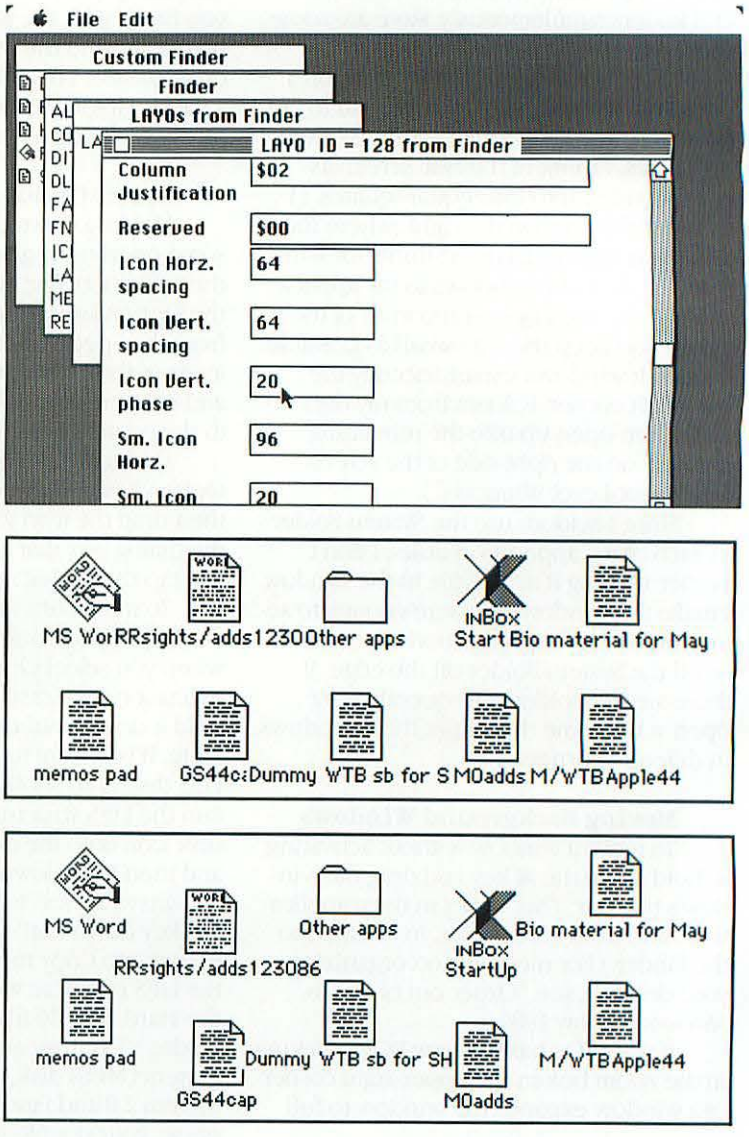
Open the Finder's LAYO resource. Another window will open, showing all of the resources of type LAYO. In this case there is only one, with ID = 128. Open it, and you'll see a scrollable list of the 38 items in the LAYO resource. "Finder Layout" shows a few of the items.

Font ID and Font Size determine the type used to display file and folder names. (Valid values for Font ID can be found in the FOND resource in the System file.)

(continues)

Finder Layout

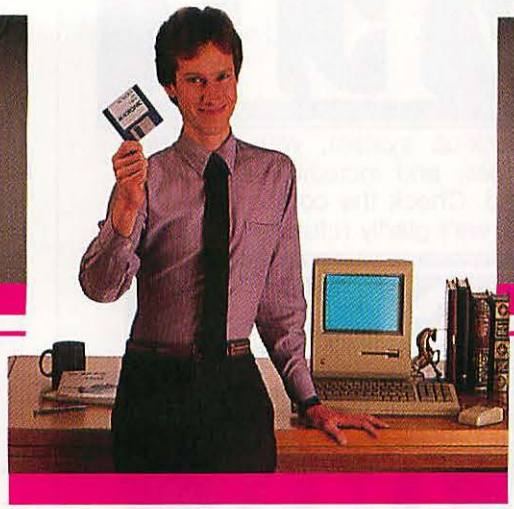
Normally the Mac offsets icons by 64 pixels when cleaning up the desktop. You can add to that number to increase the space between icons on the grid. Here, the vertical phase has been changed to allow long file and folder names to appear legibly on the desktop.



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Window Rect specifies the size and position of newly created windows. Type in the coordinates (in pixels) or click on Set and use the mouse to drag a new rectangle.

Icon Horz Spacing and Icon Vert Spacing determine the spacing (in pixels) between icons when you choose Clean Up from the Special menu.

Icon Vert Phase tells how many pixels go between adjacent icons when you clean up the desktop. If the amount is greater than 0, file and folder icons are staggered when they are cleaned up. This eliminates the annoying tendency of long file names to overlap and become unreadable (see "Finder Layout"). To avoid damaging the Finder, do not set the vertical phase bigger than the Icon Vert Spacing; nor should you set it equal to half of that value.

Sm Icon Horz and Sm Icon Vert position the small icons. Add to the value for Sm Icon Horz to accommodate long file names.

Text View Date is a hexadecimal word (four digits preceded by a dollar sign). The second digit is the one that counts. Setting it to 0 displays dates in the short form (that is, 12/14/86); setting it to 1 displays dates in long form (Sunday, December 14, 1986). Making it a 2 produces the date in this form: Sun. Dec. 14, 1986.

Default View specifies the view format for newly created windows, with a value from 0 to 5 corresponding to the menu items in the View menu. 0 means by Small Icon, 1 means by Icon, and so on down the menu. If you prefer to display your files by something other than icons, changing the default saves you the trouble of converting every window.

Setting Use Zoom Rects to 0 turns off some of the Finder's cosmetic animation. At first the desktop looks a little strange without the zooming rectangles, but the change noticeably speeds up launching applications and opening disk and folder windows.

If you never throw away the wrong file and you find those "Are you sure you want to throw away . . . " queries annoying, change Skip Trash Warnings to 1.

Changing Always Grid Drags to 1, so icons always pop to the nearest grid point on the desktop, reduces Clean Up time. Doing this with a vertical phase keeps your files organized and visible without manual adjustment.

On my Finder, I opened the ICN# resource, found the Trash Can, and altered it

(continues)

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so that I can immediately tell when I am using a modified Finder.

While you have the Finder's resources at hand, you might want to change the File Type to APPL, for application—the Finder is, in fact, an application.

Labeling it APPL allows you to change start-up disks by double-clicking on the Finder's generic application icon instead of using the ⌘-Option technique. Also, once it's defined as an application, the Finder appears as a choice in Finder-substitute programs. To make the change, close the LAYO window and the Finder window. Tell the ensuing dialog box to save changes. Select Finder in the window remaining in the foreground of the screen, if Finder isn't already highlighted. Select Get Info from the File menu, tab once, and change FNDR to APPL. Close the window, answer "Yes" when the dialog box asks if you want to save changes, and you are ready to quit *ResEdit*.

More Drastic Measures

Even with these shortcuts, the Finder can still bog things down. A radical way to make the best use of the Finder is to bypass it when its full capabilities are not needed. For a description of Finder-substitute programs (the MiniFinder being the most common), see "Mac Desktop Tools," *Macworld*, January 1987. In addition to the alternatives outlined in that article, there is another public domain program, Jan Eugenides's *Oasis*. This program works much like *Waystation*, except that it handles both applications and documents, allowing you to move, copy, or delete files, and to create folders. Additionally, by the time this is printed, Andy Hertzfeld's *Servant* should be out. Judging by the prerelease versions, *Servant* should be several evolutionary steps beyond the Finder, with *Switcher* and a facsimile of *ResEdit* thrown in for good measure.

Paradise Found

After you learn a few of the hidden secrets of the Finder, you can make it perform advanced tricks or allow it to skip some mundane interruptions. By modifying the Finder's resources, you can make it work faster and tailor the program to suit your needs and preferences. Sidestep the Finder altogether when you don't actually need it, and you will avoid much frustrating slowness. □

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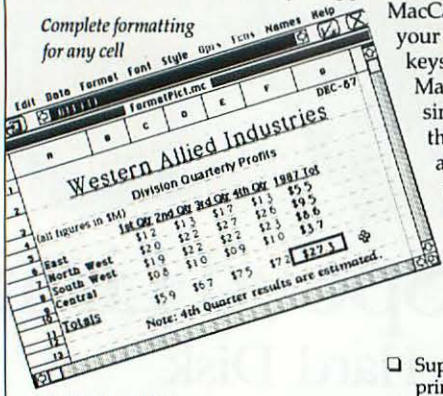
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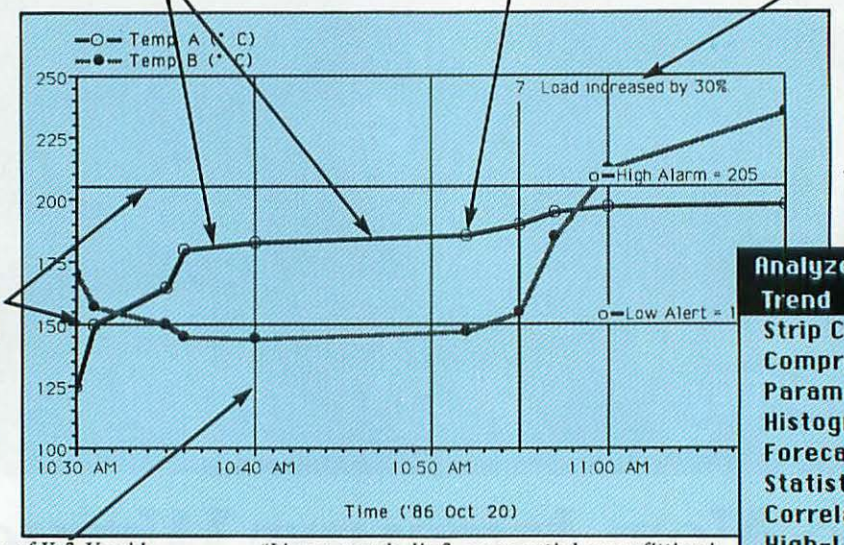
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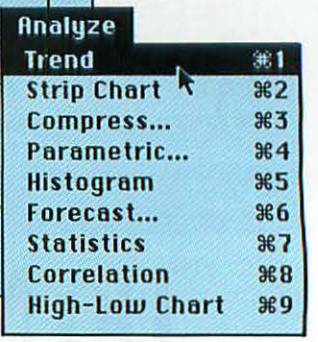
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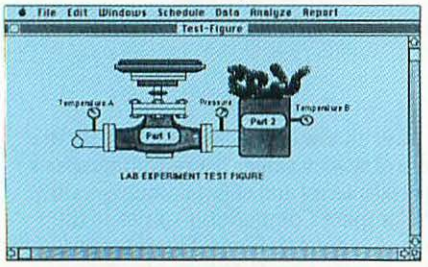


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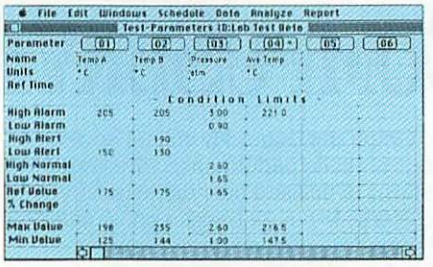
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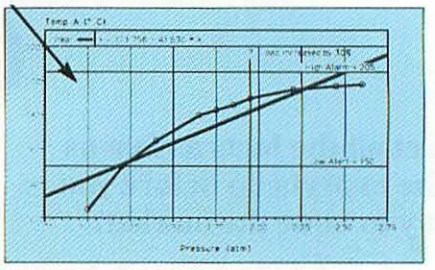
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Circle 576 on reader service card

Mac Troubleshooting Tools

A beginner's guide to staying alive

by Cynthia W. Harriman and Bencion Calica

So you think you've got problems? You flip the switch of your Mac and nothing happens, or more spectacularly, psychedelic patterns dance across the screen, accompanied by the eerie moan of distressed electrical components. Maybe the file you carefully saved before lunch now refuses to load into your machine, or your favorite program tells you, "This disk is unreadable. Want to initialize?" when you put it in the drive.

Although the Macintosh is a reliable machine overall, no computer is trouble-free. The trick is being able to recover from the little problems your Mac throws at you, and to guard against their return. Most manuals and books either take the Pollyanna approach–"Don't worry, everything will be fine"–or delve into the arcana of rewriting disk sectors. It's rarely mentioned that most common Mac difficulties can be resolved by following a few simple and logical procedures.



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Rum RAM

Most problems can be traced to one of the three basic elements of a Mac system: the user memory, or RAM; the hardware (rarely responsible); or the software.

The easiest of these to check is the Mac's RAM. Virtually everything that happens in your Mac involves binary digits, or bits, which are nothing more than on/off signals. Whenever you touch a key on the keyboard, a pattern of on/off signals travels through the memory of your machine. Stray electrical signals can get into this cycle and stir up trouble. Even though the Mac has built-in safeguards, our environment is full of electrical charges from storms, static, and other sources. What's surprising is not that occasional problems arise, but that computers have as few problems as they do.

One obvious way to start troubleshooting is simply to retry the procedure that produced the error message or abnormal behavior. Often the same procedure will work the second time around. If it doesn't, or if the problem has locked up your machine, turn off the Mac and restart it. This clears out RAM. (It also means, of course, that any data you haven't saved to disk will be lost.) When you start up again, a "clean" copy of the system software and your application are loaded into memory.

Hardware Hassles

If the problem persists, your next step should be to determine whether the culprit is your hardware or software. Try running some applications other than the one you've been using, always remembering to use a copy of your program rather than the original disk. If the same hitch occurs, all signs point to a hardware problem.

Even though hardware is seldom at fault, it's a good idea to check it early in the troubleshooting process. The procedure doesn't take long, and if you do have a hardware problem you could easily damage your disks or further damage your equipment by continuing to use it. Also, remember to take notes as you go. If you end up having to take the Mac to a dealer, your test findings may save time and money.

If you think your hardware is flawed, your next step is to try to locate the fault by process of elimination. Take all the peripherals off your Mac and see how the machine works on its own. Then, one by one, reconnect the peripherals. If you suspect a particular peripheral, try to borrow another unit of the same equipment and test it. If the borrowed unit works, then take yours to the dealer for a checkup.

Sometimes peripherals simply refuse to function. You're using your ImageWriter, for example, and no matter what you try to print, the machine gives you the message "Can't print that document". You borrow a friend's printer and get the same message–even though the printer worked fine on your friend's machine. If any peripheral, especially one attached to the printer or modem port, behaves like this, the problem may be in your Mac's battery-powered memory, known as its parameter RAM, or PRAM.

The PRAM holds the settings for your control panel–click speed, date, time, and the like. It also keeps the settings for your ports, usually set from the Chooser. As with information in any other type of

(continues)

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Quick Fixes

Here's a guide to some of the common problems beginning Mac users may encounter.



You've tried to start the Mac using a disk with no System and Finder on it. Find a start-up disk and try again.



The Mac won't start up properly. If the second digit below the icon is a number from 1 to 5, you've got a hardware problem. If it's an F, the problem is in software. Turn off the computer and try again with a start-up disk you know is good. See your dealer if the screen keeps displaying the digits.



Something happened, probably with the operating system. The codes that appear with this icon and its error message provide no real help for diagnosing or solving a bomb scare. Restart your Mac and try again. If the bomb returns, copy a new set of Finder and System files onto your start-up disk, and try again.

Make sure you're using the most recent versions of the System and Finder (at this writing, Finder 5.3 and System 3.2). If you're not sure about your versions, select the System and Finder icons on the desktop and choose Get Info. You should see "Finder . . . created June 4, 1986" and "System . . . created June 2, 1986."

If you still get frequent bombs, there may be a problem with your application software; this should not happen with established commercial software.

Intermittent disk-reading errors

Make sure your external drive is placed to the right of the Mac. Components in the computer's left side can cause electrical interference if your drive is placed on that side or on top of the machine.

LaserWriter won't print

Check all connectors on the network. Make sure every Mac on the network is using the most recent versions of the System and Finder. Pull down the Chooser desk accessory to make sure that the LaserWriter's name appears and that it's selected (appears black). If you're using an ImageWriter on AppleTalk, the same procedures apply.

memory, PRAM settings can get garbled, making it impossible for the Mac to send data out the door. The only sure cure is a Mac lobotomy: turn off the computer and remove the battery from its case, located above the machine's power cord. The Mac will forget everything stored in PRAM. After about five minutes, put the battery back in and turn on the Macintosh. Reset the time, date, and other settings. Now try your peripheral again.

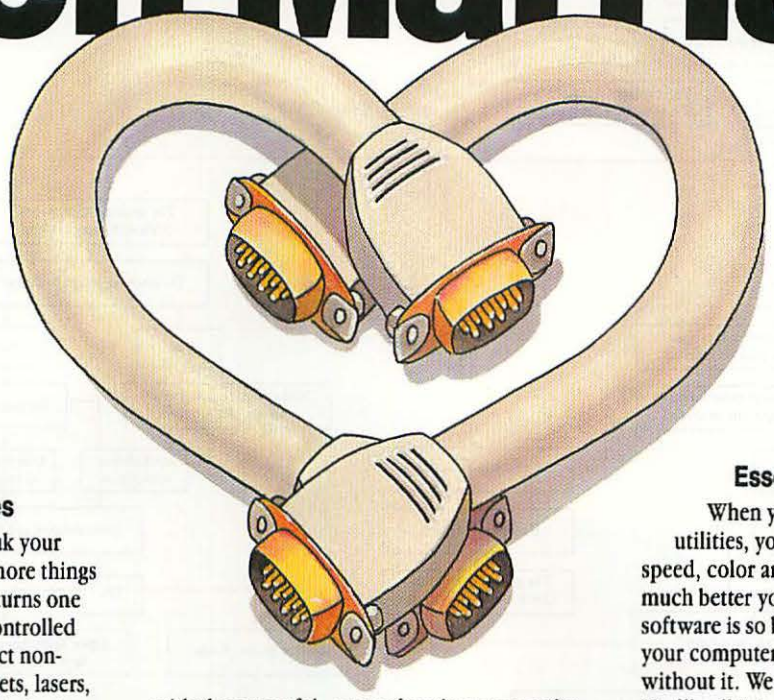
Once you've tested all your peripherals, substituted a friend's equipment, and reinitialized your PRAM, you've gone as far as you can. By now you should at least know whether the problem lies in your machine, the external drive, or another peripheral. If the machine still malfunctions, take it to your dealer.

Software Solutions

Any problem not in RAM or hardware must be in software. By now your main interest is probably not so much figuring out what's wrong as cutting your losses and getting back in business as soon as possible. Just make sure you don't make matters worse by continuing to work with corrupt data and suspect software.

(continues)

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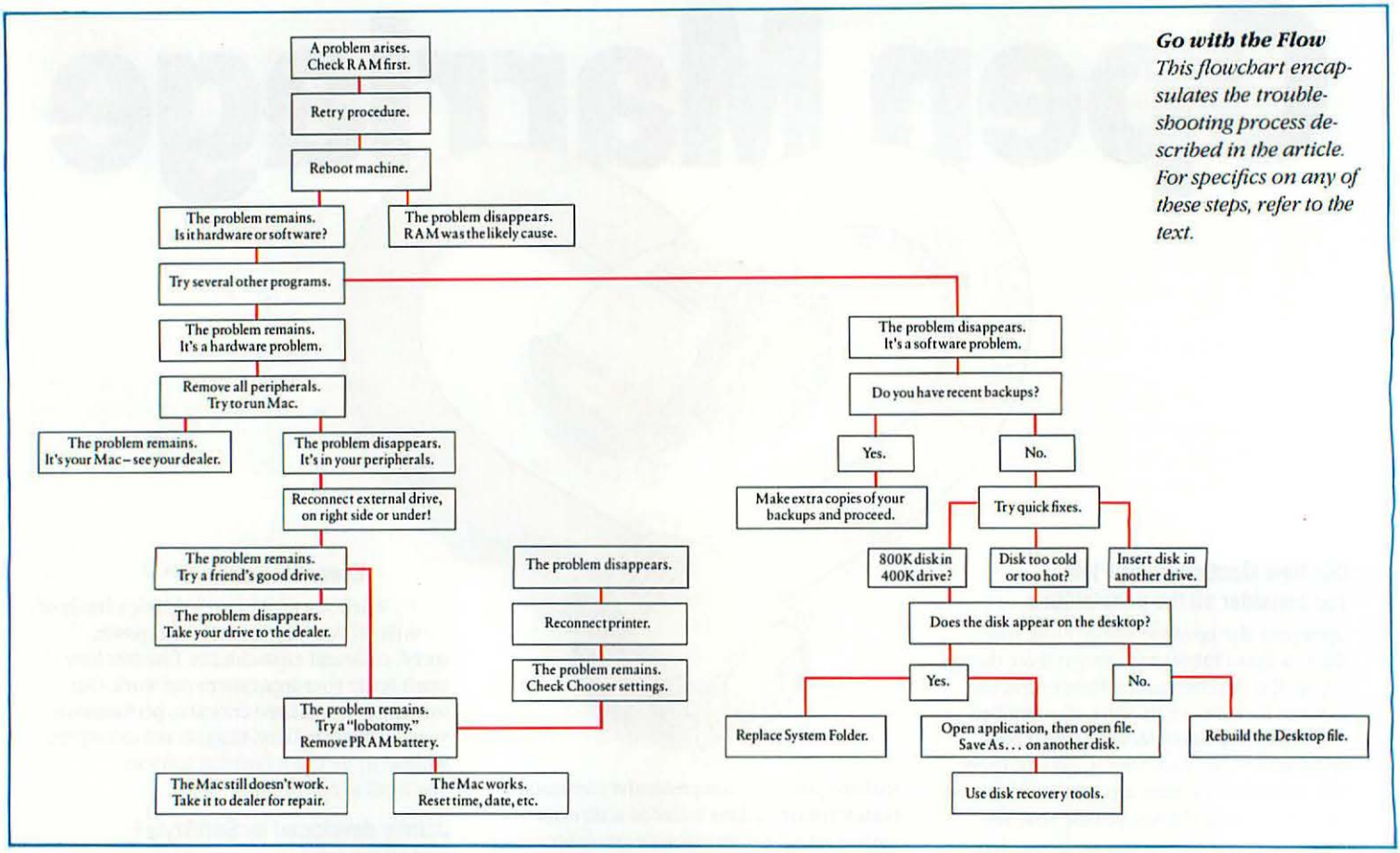
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Go with the Flow
This flowchart encapsulates the trouble-shooting process described in the article. For specifics on any of these steps, refer to the text.

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Set aside both the program and data disks you were using when the trouble arose, and make copies of your original program disk and your most recent data backup. Use a copy/archive program such as *Copy II Mac* or *MacBackup* if necessary. *Never* use your original application disks or your only data backup for anything except making working copies; keep two working copies of everything, one of which you never use. After all, whatever caused your problem could happen again, damaging your disks when it does.

If you know how to reinitialize your RAM and PRAM, and you keep backups of all your programs and data, you may never need to know anything further about Macintosh troubleshooting. All of us, though, at one time or another, have "just this once" skipped making a backup. If you find yourself with no backup, or a badly outdated one, there are a few things to try before major disk surgery is necessary.

Often programs will give the message "This disk is damaged [or unreadable]. Do you want to initialize?" Be sure to decline this generous offer; you could be getting this message for one of several reasons:

- You're using a double-sided (800K) disk in a single-sided (400K) drive. Double-sided disks can only be used in double-sided drives, although any drive should read a single-sided disk.
- You're using a disk that's been left out in the cold, in the sun, or near a radiator. Disks shrink and expand in temperature extremes. Let the disk stabilize to room temperature, then try again.
- You're using a disk formatted on another drive. Sometimes slight differences in drive speed or alignment can make a disk from one drive unreadable on another. Try your other drive, or another machine.

If these simple fixes don't do the trick, it's time to look to the disk's contents. Three kinds of information can be on non-program disks: System information (such as the System, the Finder, or printer files), housekeeping information (information the Mac uses to catalog the files on a disk), and your own data. If the disk that begs to be initialized is a System (start-up) disk, try copying new System, Finder, and ImageWriter or LaserWriter files onto the disk. Make sure they're all the newest versions.

If the disk still won't appear on the desktop, try rebuilding its Desktop file. This is an invisible file on every disk where the bulk of the disk's housekeeping data is kept. Rebuild the file by holding down the Option and ⌘ keys while inserting the disk. You'll have to rename all your folders, as this process gives them catchy names like "unnamed 1" and "unnamed 2", but your data should be accessible.

Sometimes even when a disk appears on the desktop, double-clicking on an individual file fails to open it. This may mean that the housekeeping information linking a file to a specific application has been damaged. To reestablish the link, try opening the application first, then opening the file from within the application. Once you get into the file, use Save As to make a copy of it on another disk. The link is reestablished when you save a copy.

HFS versus MFS

If none of the previous solutions has helped you, it's most likely that stray bits have contaminated your data. If you have a 400K MFS disk (Macintosh File System—the old "flat file" system), several tools on the market can assist you in attempting to re-

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File First Aid

The definitive product for troubleshooting on the Macintosh is the *1st Aid Kit* from 1st Aid Software. *1st Aid* consists of a comprehensive manual, a disk of recovery tools, and a few disks of sample files. The great thing about this product is that it takes the "techie" aura away from Mac troubleshooting, making the subject accessible.

The *1st Aid* manual starts off with a quick discussion of Macintosh problems, followed by a thorough explanation of how Mac disks are made up—a behind-the-scenes look at file structure. If you're yawning from boredom or cringing with fear at the thought of digesting such a topic, don't. The authors have made a potentially complex subject clear, and in the long run, you'll better understand why something has gone wrong if you first understand how it "goes right." A section on problem prevention wraps up *1st Aid*'s background material.

If you're already facing a disaster, you'll most likely skip right to the heart of your *1st Aid Kit*—three chapters of troubleshooting techniques. In Chapter 4 of the manual you'll find 16 pages of the most comprehensive error-message list ever assembled, including messages generated by the System, the Finder, *MacPaint,* and *MacWrite.* Self-explanatory messages are merely listed, while those that are less obvious refer you to the relevant problem category in Chapter 5.

Chapter 5 covers 35 problem areas. For each area, *1st Aid* presents a list of "try this, try that" procedures, giving the easiest and most likely ones first.

Finally, Chapter 6 supplies step-by-step directions for carrying out your chosen repair procedure. If you're nervous about trying out disk surgery on your own, *1st Aid Kit* includes a damaged disk for practice operations.

The *1st Aid* software includes all the features the average Mac user could want for routine problem solving. You start with a bit-copy routine that makes a work copy of your damaged disk, then proceed to the Diagnose menu to figure out what's wrong. Here you can verify that there are no bad disk sectors, or check the volume directory, file directory, or sector tags. Once you get an idea of what's wrong, the Repair menu offers a chance to fix the volume directory, the file directory, the sector tags, or the boot blocks. You can also undelete files or fix a file's creator and type.

All of these features are available in other products, such as *MacTools* and *Fedit,* but *1st Aid* makes the procedures more accessible by putting them all in one place, arranged in logical menus with comprehensive explanations. The *1st Aid* software throws in a few extra capabilities, too: it can erase deleted files (a security measure) and extract text from a damaged file.

1st Aid's only drawback is that much of it does not apply to HFS disks. At press time the company was working on a new version, which will be available as an upgrade. In the meantime, the background information, preventive tips, and at least part of the disk-recovery information in *1st Aid* still serve as valuable resources for troubleshooting.

For most of us, disk and file recovery fall within the realm of things we know we should pay attention to but we avoid, like flossing our teeth and eating leafy green vegetables daily. When you're finally ready to admit that you should understand more about how your disks work—and why they sometimes fail to work—take a look at *1st Aid.*

cover your data. The *1st Aid Kit* (see "File First Aid") is an excellent tool for helping nontechnical users learn about and practice disk recovery. See "Recovering a Damaged Disk," *Macworld,* November 1985, for details on using other popular tools.

Most hard disks and disks formatted under the Hierarchical File System (HFS) need different file-recovery tools than MFS disks. The change in file structure from MFS to HFS was so vast that HFS recovery tools are still unavailable at this writing, more than a year after Apple introduced HFS. Two software companies, MacMaster and Central Point, have promised HFS versions of their recovery packages—*Fedit* and *MacTools,* respectively. These upgrades may be available by the time you read this.

Take Two Aspirin . . .

Running for a disk-recovery expert whenever you get an error message is like calling the doctor every time you get a mosquito bite or catch a cold. With just a little bit of information and a good dose of confidence, anyone who can use the Mac can solve the majority of the machine's most common problems.

The next time Murphy's Law catches up with you, give some of these tips and tools a try. □

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Updates

This list brings you the highlights of software updates recently received but not yet tested. The first price is the upgrade price for registered owners; the last price is the current list price.

GraphicWorks version 1.1 includes on-screen rulers and rotation, perspective, and distortion tools. It allows color printing and supports high-resolution scanners and versions 1.2 and 2.0 of *PageMaker.* Mindscape, 3444 Dundee Rd., Northbrook, IL 60062, 312/480-7667. $19.95; $99.95 new.

Laser Author version 1.0 does away with copy protection. E.L.I., 71 N. Franklin Turnpike, Waldwick, NJ 07463, 201/444-5700. $199.95 new.

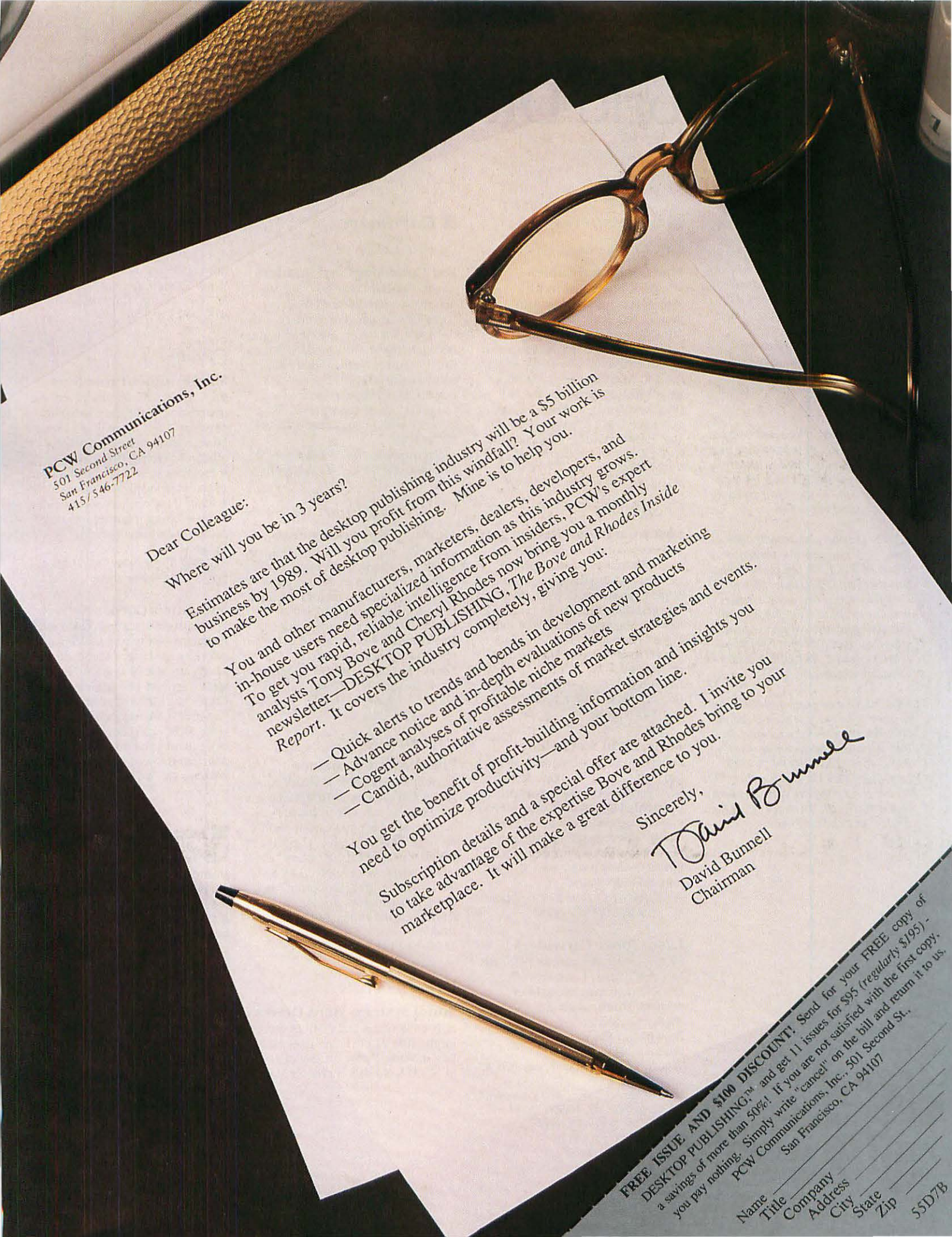
MapMaker version 2.0 allows some multiple selections when creating a map from boundaries, supports PICT format output for text and supports LaserWriter fonts, adds rulers in the Map Scale dialog box for easier page positioning, and improves operation on large-screen displays. The new version also offers more data options and an expanded manual. Select Micro Systems, 2717 Crescent Dr., Yorktown Heights, NY 10598, 914/245-4670. Free; $295 new.

measureUp version 1.2 lifts copy protection, allows separate instructions for different sections of a test, and has a lower list price. Logic Extension Resources, 9651 Business Center Dr., Rancho Cucamonga, CA 91370, 714/980-0046. Free; $149 new.

PC MacBridge/Plus version 3.0 adds printing and formatting options; supports binary, block, and ASCII transmission; and improves PostScript conversion. It supports printing on Houston Instrument DMPL plotters and works with *Microsoft Windows, PageMaker* for the PC; and other applications on the PC. Upgrade offer good until June 1, 1987. PC MacBridge 3.00 Upgrade Offer, Tangent Technologies, 5720 Peachtree Pkwy., Norcross, GA 30092, 404/662-0366. $100 from version 1.99 or earlier, $75 from versions 2.00 to 2.16, $50 from version 2.16 if purchased after August 1, 1986; $650 new.

Smart Alarms version 2.3 (packaged with Appointment Diary version 2.7) adds keyboard shortcuts and a snooze feature for the alarm, allows automatic setting of weekly appointments, and improves compatibility with *Tempo.* Imagine Software, 19 Bolinas Rd., Fairfax, CA 94930, 415/453-3944. $8; free to registered *Tempo* users; $49.95 new.

Turbo Maccountant version 2.0 adds advanced payroll functions and flexible budgeting and improves operation speed. Digital, Etc., 1750 14th St., Santa Monica, CA 90404, 213/452-5636. $15 if previous version was purchased after September 1, 1986; $95 if purchased before then; $495 new. □



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Macworld Directory

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FORMAT: The standard format includes a product ID, a 300-character descriptive ad, and a company name, address, and telephone number.

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■ Hardware

○ Bar Code

Bar Code/MagCard Readers
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TPS Electronics, 4047 Transport St., Palo Alto, CA 94303, 415/856-6833

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○ Peripherals

Sunol Systems Hard Drives
SUN*DISK offers 21-245MB of storage for the IBM, Apple II and IIGS, Mac, Epson, Wang, Victor, etc. Sunol's SUN*TALK is a disk server for Mac products. SUN*MUFS is a file server for the Mac. SUN*STREAK is a SCSI drive for the Mac Plus. Prices range from $1095 up.
Sunol Systems, Inc., 1177 Quarry Ln., Pleasanton, CA 94566, 415/484-3322

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Digicalc Informatique, 425 De-Maisonneuve W. #030, Montreal, P.Q., Canada H2A 3G5, 514/288-9167

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Mesa Graphics, P.O. Box 600, Los Alamos, NM 87544, 505/672-1998

Mac2624: HP Terminal Emulator

Lets your Mac emulate the HP2624, HP2392, and HP2394, reliably running all HP3000 software. Implements HP modes, parameters, keyboard features, and display characteristics within the Mac's mouse/menu/⌘-key environment. Ultrafast file transfer (with text and graphics conversion options) included.
Tymlabs Corp., 211 E. Seventh St., Austin, TX 78701, 512/478-0611, Telex 755820

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Artificial Mind Software, P.O. Box 17590, Pittsburgh, PA 15235-0590

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File Conversion

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Survivor Software Ltd./w, 11222 La Cienega Blvd. #450, Inglewood, CA 90304, 213/410-9527

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GenMicronics, 5900 Shore Blvd. #401, St. Petersburg, FL 33707, 813/345-5020

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Allotype Typographics, 1600 Packard Rd. #5, Ann Arbor, MI 48104, 313/663-1989

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Applied Ideas, Inc., P.O. Box 3225, Manhattan Beach, CA 90266, 213/546-6461

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- Signs/Symbols/Borders

Sgl. disks $39.95. Full library $250. Sampler $49.95. $3 s/h. Other disks.
CompuCRAFT, P.O. Box 3155, Englewood, CO 80155, 303/850-7472

MGMStation

by Micro CAD/CAM, Inc., is a high-powered, easy-to-use CAD program for the Mac, similar in performance to *AutoCAD* for the IBM PC. *MGMStation* boasts over 140 powerful functions, including XY coordinate, polar, or digital data input; 100× zoom; accuracy to 4 decimals; & much more! Demo disk &/or VCR tape available. $799.
CompServCo., 800 Freedom Ln., Slidell, LA 70458, 800/272-5533, 504/649-0484

MacPlot & MacCAD

MacPlot by Microspot is a powerful plotter driver that will plot any object-oriented graphics produced on the Mac in up to 30 colors/pens. Supports over 45 plotters. MacCAD is a series of 12 separate architectural & engineering template libraries for use with either *MacDraw* or *MacDraft* (specify which).
CompServCo., 800 Freedom Ln., Slidell, LA 70458, 800/272-5533, 504/649-0484

Image Measurements

Caliber™ is the high-powered program you need to accurately measure area, length, angle, slope, velocity, form, center of gravity, etc. Fast entry with tablet or mouse. 20 data channels each with statistics and graphics windows. *Caliber*™ counts, rescales, sorts, and merges. Imports and exports graphics and data. Intro. offer $295 MC/Visa. Demo avail. $10.
Caliber Systems, 60 Manor St. Hamden, CT 06517, 203/281-7621

MiniCAD 2D/3D

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Diehl Graphsoft Inc., 3246-K Normandy Woods Dr., Ellicott City, MD 21043, 301/461-9488

Interesting Graphics

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AAH Computer Graphics Productions, Box 4508, Santa Clara, CA 95054, 408/980-7363

○ *Languages*

Multitasking for the Mac

MACH2, a multitasking FORTH83 development system, in THE language for interactive Mac programming: COMPLETE toolbox access, integrated assembler (MDS-format)/debugger/disassembler/text editor, FAST execution, creates stand-alone applications, 500-pg. manual. Booth #940 at the Expo. $99.95 (+CA tax) Visa/MC.
The Palo Alto Shipping Co., P.O. Box 7430, Menlo Park, CA 94026, 415/854-7994

Lisp Development System

MacScheme+Toolsmith™ lets you program the Mac interactively in Lisp: Complete access to Toolbox traps, multitasking, high-level window & menu managers, interrupt-driven event handlers (no more polling!). Includes *MacScheme*™ Lisp

system. 1M RAM recommended. Introductory price $250.
Semantic Microsystems, 4470 S.W. Hall St. #340, Beaverton, OR 97005, 503/643-4539

○ Mathematics

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Central Products Corp., 221 Norfolk #518, Houston, TX 77098, 713/529-1080

○ Medical

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CMA Micro Computer, 55888 Yucca Trail, P.O. Box 2080, Yucca Valley, CA 92286-2080, 619/365-9718

○ Networking

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Western Software Associates, 110 El Dorado Rd., Walnut Creek, CA 94595, 415/935-3673

○ Plotter Drivers

Plot-It
Plots *MacDraw, MacDraft, MacProject, MacPaint*, etc., on popular Apple, Hewlett-Packard, or Houston Instrument pen plotters in sizes A, B, C, D, & E. Use for accurate engineering & architectural drawings or color data plots. Flexible color interface & scaling. $125. See review in Sept. '86 *Macworld*.
Mesa Graphics, P.O. Box 600, Los Alamos, NM 87544, 505/672-1998

○ Printer Drivers

Mac Palette
By Microspot, prints pictures & text in color from within most Mac software, using the ImageWriter II. It may be accessed using the Choose Printer & Print commands. It supports *MacDraw, MacDraft, MacWrite, Word, Excel, PageMaker, Jazz, Chart, MacProject* (not bitmapped graphics, e.g., *MacPaint*). $69.
CompServCo., 800 Freedom Ln., Slidell, LA 70458, 800/272-5533, 504/649-0484

The Print-Link™
A printer driver program, complete w/cable, that works with dot matrix, daisy wheel, & ink jet printers for the Mac. Mfr's supported are Apple, Brother, C. Itoh, Citizen, Comrex, Diablo, Dynax, Epson, Infoscribe, Juki, Okidata, Panasonic, Qume, Siemens, & more. $84.95.
GDT Softworks Inc., P.O Box 1865, Point Roberts, WA 98281-1865, 604/291-9121, 800/663-MACC (6222)

○ Programming Tools

Programmer's Extender™
Compiled libraries speed up Macintosh application development. Vol 1: windows, menus, text edit, scroll bars, dialogs. Vol 2: list mgr. support, text & graphics printing & I/O, marquee, lasso, zooming, & tiling windows. Avail. for *LightspeedC, TML Pascal, & Lightspeed Pascal.* $89.95/volume.
Invention Software Corp., P.O. Box 3168, Ann Arbor, MI 48106, 313/996-8108

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Translatum International, 1730 E. Oltorf St. #127, Austin, TX 78741, 512/442-0266

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Yardi Systems, 3324 State St., Ste. O, Santa Barbara, CA 93105, 805/687-4245

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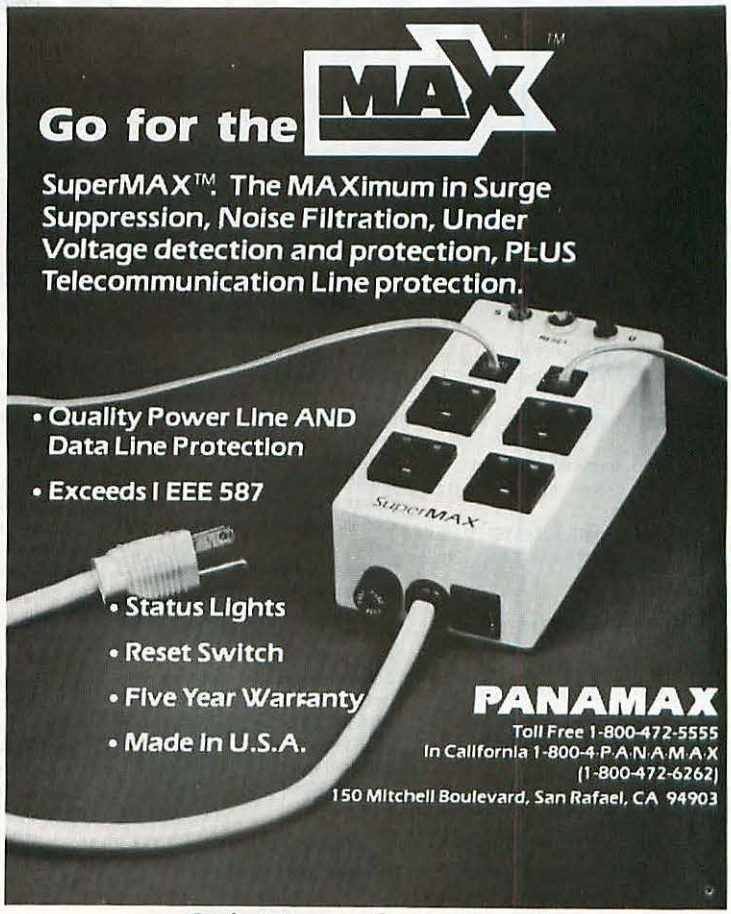
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Oceanside Software, P.O. Box 2028, Walnut Creek, CA 94595-2028, 415/947-1000

○ *Word Processing*

Japanese Word Processor

- *E/G Word* allows the user to input alphabets, which turn into kana-syllabaries on screen that can be converted to Kanji (3500) characters. $399. Req. 512K.
- *E/G Bridge* ($249) and *JAM* ($149) allow the user to input Japanese in major Mac application software.

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Spellcheck (4104) A speller and extensive dictionary for Macwrite 2.2 and textfiles.

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Excel templates (4165) Database Macros, 1st. and 2nd. Mortgage, Time Weighted IRR, Roots of Euqations, Steam Volume, Triangles, Monthly Calendar, Truth in Lending, Lailing Label II, Tax Templates, Macro Function Tutor & Travel Expense Weekly.
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(4167)dMAC III Demo & Examples Relational Database program.

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Red Ryder Macros (4090) Contains Dow Jones™ & E. F. Hutton Quotes. Also contains a listing of area codes.
Termworks 1.2 (4112) Supports MacBinary & Macro capability for storing numbers & protocol settings. Also included are Freeterm 1.8, PackitIII and FModem.
Communication Utils (4107) BinHex 5.0. Supports the new .BIN protocol, as well as the old .HEX, .HCX & .HQX protocols. PackIt III 1.2 (Compress your data for faster transmission), Compact, AppleTalk Chat and more.

Hacker Tools

H. Tools (4100) DrawPaint 1.0 (Convert MacDraw files to MacPaint.) TabUtil. (Text File processor: add or remove tabs.) Icon Exchanger, Icon Collector, Cleanup, Iconer & more.
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Programmer Utilities (4162) Softools™ (Draw many standard software engineering drawings such as Dataflow diagrams, flowcharts etc.). Fast Eddie A powerful programmers' text editor. Includes documentation. Also included is MacroEdit.
Programmer Utilities (4163) MemTest, MightFinder, FOBT Format, PRAM 2, Font -FKEY-DA sampler. (This very useful program will open any font, Desk Accessory or Function Key without having to install them onto the System. Also included: Cleanup, Mac ID, Hex & Ascii Strings.
Developer Stuff (4087) ResDecompile. (A Macintosh application which can convert certain types of resources in a resource file, into source code suitable for compiling with ResEdit (Apple's Resource Editor).
Developer Stuff (4088) Obi, Systems ID's, archiver & more.

Desk Accessories

Text Reader (4041) MultiScrapbook, Icon Install, Auto log, and dCad Calculator.
Quick Print (4042) MiniFinder D/A, HP 12C Calculator, Hacker D/A's, D/A Sampler, more.
Hacker D/A's (4044) Abacus, Timer, MemScan, NumCaps, Continuity, MacVision 1.1, Knockout windows.
Hacker Tools (4108) Patchdisk, Purge Icons, Disk Test, Answering Machine, and Fast Disk Copy.
Icon Maker 2.0 (4045) Design your own icons). QuickPrint (Print textfiles while working on other applications), Financial Calculator etc.
Function Key (4046) Desk Accesory, Font/DA Mover 3.2, Fkey Installer, Fkey Sampler.
Rolodex, Disk (4047) Info, Fun D/A's, Fkeys: Fonstie & Showkey.

Telecommunication DA's

MockPackage (4048) Use your modem concurrently while working on other programs. MockWrite, MockTerminal, MockPrint. Disk Info D/A's: Checksum, Utilities 2.0, Disk Info 1.42.

Communication Utilities (4107) Binhex, Appletalk Chat, Cheese Hacker Pack II.

Graphics Desk Accesories

Artisto (4049) (Loads MacPaint files), Animator, Read Macwrite D/A, Function Key installer and sample function keys.

(4014) Big Ben (clock D/A), Calendar, & Text File Reader.

Disk Cataloger:

Disk Librarian (4098) Excellent for cataloging extensive libraries. Just run the program & insert disks. Includes multiple sort functions.

Music

MacNifty (4124) This disk contains realistic digitized sounds that may be altered by changing the sampling rate. Sounds included.
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These programs require a MIDI Keyboard.

Midi Synthesizer programs.

Midi Terat (4117) Midi 2, Midi Mouse, 7th Heaven
CZedit Demo (4118) CZlibrarian (For use with the Casio CZ101™ Keyboard).

Educational

Flachcard (4138) Orbital Mixing & Grades folder.
Math Master (4139) Venn, Conformal Maps, Automata, Tree and Tangent.
Speech Synthesis (4140) The following programs demonstrate Speech Sybthesis: Rona,Talking Eliza with demo files & instructions, Speak Easy and La Limerick Machine. (This one will read limericks that are typed .

Math Tutor (4181) Weinberg. This program facilitates drawing math functions like integrals,summations etc. Equation, Math Drill & Camera tutorial.

Utility Programs

System Utilities (4182) BootEdit (Alter the Welcome to Macintosh message),Change application font, Install (Install resources to your system that will RESUME your program after many system bombs), Window Changer (lets you customize the Save As & Open dialog boxes)
Disk Utilities (4183) Disk Cat. Disk cataloging program. Disk Test, Display (text file reader), & Scavenger Mac (recover files).
Diagnostic Utilities (4184) DiskTest, Speed Check, Ram Test 1.7, Dir-Acta-ry (Reads directory of & disk then converts it to an outline document for use with the Acta DA.), Remount HD20 (Remount an Apple HD20 that has been accidently thrown into the trash).

Updated Disks

Redit 1.2 (4185) European Resource editor. This program is excellent for translating Macintosh programs to other languages. It does nor alter any of the resources.

Switcher 5.0.1 (4186)

Languages

Basic Compiler (4101) Complete with documentation and examples.
Smalltalk (4099) Disk also includes Ada and a 68000 disassembler.
Xlisp 1.4 (4037)
McAsm (4033) 68000 Assembler and Linker.

Engineering:

DesignScope (4119) Simulation Program that helps design component Circuitry.(Demo Version)

Digital Simulator (4120) Digital Logic Simulator.

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This section contains information about products featured editorially in this issue. Programs are not copy protected unless otherwise indicated. All prices are list prices. An asterisk indicates that a product review appears in this issue.

Public domain software and shareware are available through on-line information services, through user groups such as Berkeley Macintosh Users Group (415/849-2684) or the Boston Computer Society's Mac special-interest group (617/367-8080), or through mail-order clearinghouses such as Educomp, 2429 Oxford St., Cardiff-by-the-Sea, CA 92007, 619/942-3838, or the Public Domain Exchange, 673 Hermitage Ln., San Jose, CA 95134, 408/942-0309.

Aquarium
Public domain software. 128K minimum memory.

Arazok's Tomb
Version 1.0. Aegis Development, 2210 Wilshire Blvd. #277, Santa Monica, CA 90403, 213/392-9972. 512K minimum memory. $49.95.*

Aztec C 68K
Version 1.06 H. Manx Software Systems, P.O. Box 55, Shrewsbury, NJ 07701, 201/542-2121, 800/221-0440. 128K minimum memory for Level-R, 512K minimum memory for Level-D and Level-C. Personal package (Level-R) $99, Developer (Level-D) $299, Commercial (Level-C) $499.*

Bar-code Labels
Data Composition, 1099 Essex, Richmond, CA 94801-2185, 415/232-6200, 800/227-2121. Also available from Seton Name Plate Corp., 20 Thompson Rd., Branford, CT 06405, 203/488-8059. Call for quotes on custom orders.

Beep Init
Public domain software by Fractal Software. 512K minimum memory; speaker recommended.

Bouncy
Public domain software. 128K minimum memory.

BPI Entry Series General Accounting
Version 1.00. BPI Systems, Inc., 3001 Bee Cave Rd., Austin, TX 78746, 512/328-5400, 800/531-5252. 512K minimum memory; external drive recommended. $249.*

The Bug
Public domain software. 128K minimum memory.

Cap'n Magneto
Shareware, also available from PowerTools, 1206 Karen Ave., Austin, TX 78757. 128K minimum memory; 512K or Mac Plus recommended. Send $20 and a blank disk, or $30 without disk.*

Clock
Public domain software by Mark Wall.

CompuServe
CompuServe, Inc., 5000 Arlington Center Blvd., P.O. Box 20212, Columbus, OH 43220, 614/457-0802, 800/848-8199. Modem required. Subscription kit $39.95; rates for prime time (8 a.m. to 6 p.m. M-F): 300 baud $12.50 per hour, 1200 to 2400 baud $15 per hour; standard time (6 p.m. to 8 a.m. M-F, weekends): 300 baud $6.00 per hour, 1200 to 2400 baud $12.50 per hour, plus 25-cents-per-hour surcharge when dialing a local CompuServe phone number; if there is no local number the prime-time surcharge is $10 per hour, standard time $2 per hour.

Copy II Mac
Version 6.0. Central Point Software, 9700 S.W. Capitol Hwy. #100, Portland, OR 97219, 503/244-5782. 512K minimum memory. $39.95; includes MacTools and Copy II Hard Disk.

Crabs
Public domain software. 512K minimum memory.

DataFrame 40-XP
SuperMac Technology, 950 N. Rengstorff Ave., Mountain View, CA 94043, 415/964-8884. 512K minimum memory; requires SCSI port. $1999.*

Delphi
General Videotex Corp., 3 Blackstone St., Cambridge, MA 02139, 617/491-3393, 800/544-4005. Requires modem. $49.95 one-time fee; rates through TimeNet or TeleNet: 7 a.m. to 6 p.m. (M-F) 29 cents per minute, 6 p.m. to 7 a.m. (M-F, weekends, and holidays) 12 cents per minute. Direct-dial rates: 7 a.m. to 6 p.m. 16 cents per minute, (6 p.m. to 7 a.m. M-F, weekends, and holidays) 11 cents per minute.

DeskScene
Version 1.0. PBI Software, Inc., 1111 Triton Dr., Foster City, CA 94404, 415/349-8765, 800/843-5722. 128K minimum memory. $29.95.

Dial-a-Disk
Total Systems Integration, Atrium Bldg., 99 W. Tenth St. #333, Eugene, OR 97401, 503/345-7395, 800/874-2288. Holds twenty 3½" disks. $14.95.

Disc Organizer
Bede Tech, Inc., 8327 Clinton Rd., Cleveland, OH 44144, 216/631-1441, 800/772-4536. $7.95.

The Disk Directory, The Easel, The Library
Innovative Technologies/Communications, 5649 La Jolla Blvd., La Jolla, CA 92037, 619/456-0722, 800/525-2226. The Disk Directory $29.95, The Easel $19.95, The Library $49.95.

Disk Easel
West Ridge Design, Inc., 305 N.W. Twelfth Ave., Portland, OR 97209, 503/248-0053. $20.*

Disk File, Disk Jacket
Weber and Sons, Inc., 3468 Hwy. 9, Freehold, NJ 07728, 201/431-1128, 800/225-0044. Disk File $9.95, Disk Jacket $11.25 per package of 25.

Disk Jackets, Disk Pockets
International Datawares, Inc., 2278 Trade Zone Blvd., San Jose, CA 95131, 408/262-6660, 800/222-6032. Disk Jackets $5 for two packs of ten, Disk Pockets $2 per package of ten.

Disk Book Series
MicroStore, P.O. Box 37, St. Peter, MN 67082, 304/292-8424, 800/962-8885. DiskBook-10 $14.95, DiskBook-32 $29.95, DiskBook-Plus $29.95.

Disk Pockets
See Disk Jackets.

DiskWallet
CompuCover, P.O. Box 310, Mary Esther, FL 32569, 904/243-5793, 800/874-6391 (orders only). Holds twenty 3½-inch disks. $16.95.

Dow Jones News/Retrieval Service
Dow Jones & Company, Inc., P.O. Box 300, Princeton, NJ, 08543-0300, 609/452-2000, 800/257-5114. Requires modem. One-time subcription fee:

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personal $29.95, corporate $49.95. Additional rates differ, depending on the database and baud rate; there are 40 different databases on the service.

EarthPlot
Version 2.0. Public domain software. 128K minimum memory.

The Easel
See The Disk Directory.

Fedit Plus
Version 2.0. MacMaster Systems, 108 E. Fremont Ave. #37, Sunnyvale, CA 94087-3201, 408/773-9834. 512K minimum memory. $49.95.

1st Aid Kit
Version 1.0. 1st Aid Software, 42 Radnor Rd., Boston, MA 02135, 617/783-7118, 800/843-3497. 128K minimum memory. $99.95.

Floppy Wallet
American Covers Inc., P.O. Box 1796, Sandy, UT 84091, 801/566-3100, 800/228-8987. $9.95.

FModem
Shareware, also available from Christian Doucet, P.O. Box 721 Branch R, Montreal, Quebec, Canada H2S 3M4. 512K minimum memory; requires System 3.2 and modem. $20.*

GEnie
General Electric Information Services Co., 401 N. Washington St., Rockville, MD 20850, 301/340-4000, 800/638-9636 ext. 21. Requires modem. $18 one-time fee; rates for prime time (8 a.m. to 6 p.m. M-F): 300 to 1200 baud $35 per hour, 2400 baud $45; nonprime time (6 p.m. to 8 a.m. M-F, weekends, and holidays): 300 to 1200 baud $5 per hour, 2400 baud $15 per hour.

Gone Fishin'
Public domain software by Wade Blomgren. Buggy; can cause disk crashes.

Great Plains Accounting Series
Version 4.1. Great Plains Software, Inc., 1701 S.W. 38th St., Fargo, ND 58103, 701/281-0550, 800/345-3276. Register disk to remove copy protection. 512K minimum memory; requires 800K drive and keyboard with numeric entry and arrow keys; Mac Plus and Hard Disk 20 recommended. A/P, GL, A/R, Payroll, Inventory, Order Entry with POS, Purchase Order, $695 per module; Job Cost module $395.*

Hardball
Accolade, Inc., 20833 Stevens Creek Blvd., Cupertino, CA 95014, 408/446-5757. Not copyable. 128K minimum memory. $44.95.*

Icon Switcher
Version 1.2. PBI Software, Inc., 1111 Triton Dr., Foster City, CA 94404, 415/349-8765, 800/843-5722. 128K minimum memory. $19.95.

The Library
See The Disk Directory.

LogicWorks
Version 1.1. Capilano Computing Systems Ltd., 1120 Hamilton St. #300, Vancouver, B.C., Canada V6B 2S2, 604/669-6343. 512K minimum memory. $159.95.*

Maccessories Disk Case
Kensington Microware, 251 Park Ave., New York, NY 10010, 212/475-5200, 800/535-4242. $29.95.

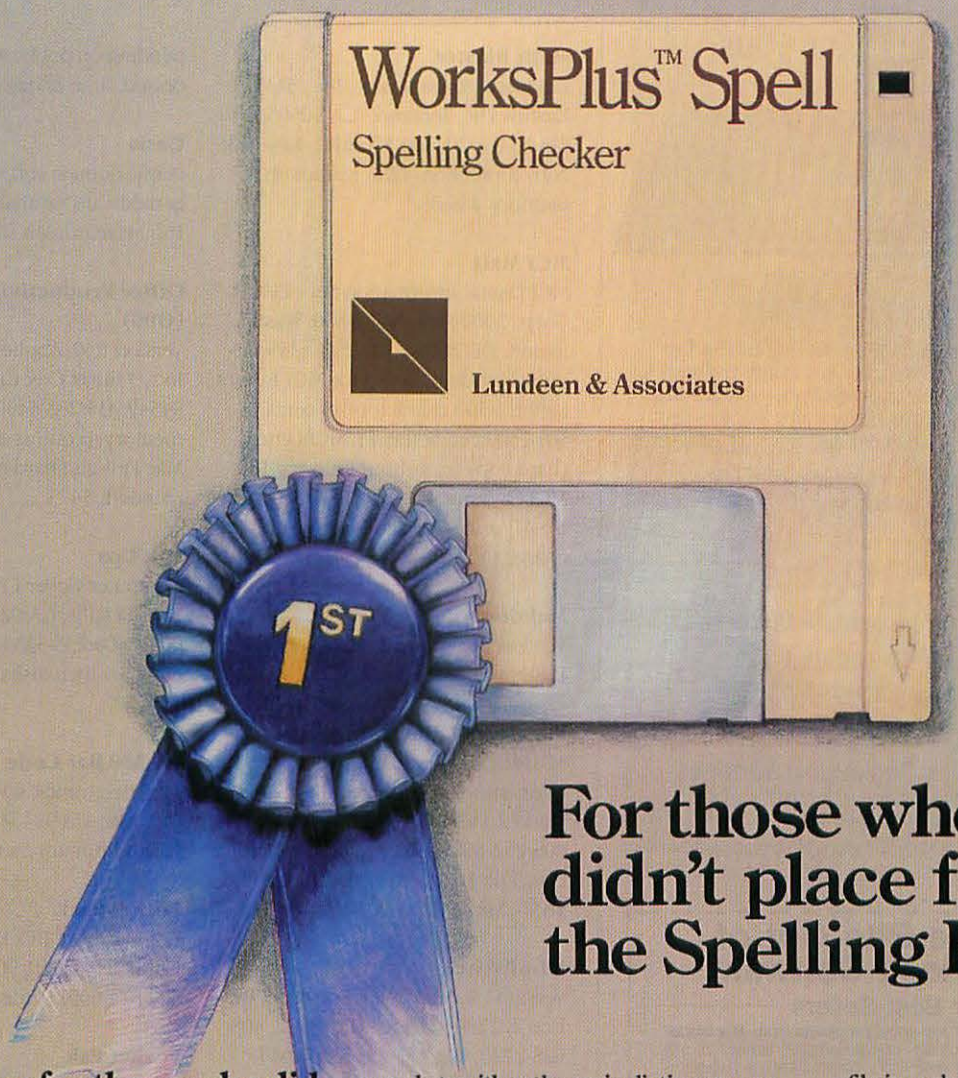
MacinTalk
Public domain software.

MacLink Plus
Version 1. DataViz, Inc., 16 Winfield St., Norwalk, CT 06855, 203/866-4944. 512K minimum memory. $195.*

MacServe
Version 2.1. Infosphere, 4730 S.W. Macadam Ave., Portland, OR 97201, 503/226-3620. Copy detection. 512K minimum memory; server requires hard disk and AppleTalk; Mac Plus recommended. $250.

MacWait
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Where to Buy

Math Blaster
Davidson & Associates, Inc., 3135 Kashiwa St., Torrance, CA 90505, 213/534-4070, 800/556-6141. Key-disk copy protection. 128K minimum memory. $49.85.*

MCI Mail
MCI Digital Information Services Corp., 2000 M St. NW #300, Washington, DC 20036, 202/293-4255. Requires modem. Prices for MCI Instant Letter: 1-500 characters 45 cents, 501-7500 characters $1; MCI Letter (hard copy) four-hour delivery $30, MCI Overnight Letter $8, MCI Letter $2. All prices are send prices; no charge to receive.

Meltdown
Version 1.0. Public domain software. 128K minimum memory.

Micro Data File, Micro Disk Minder, Micro Flip Pak
International Datawares, Inc., 2278 Trade Zone Blvd., San Jose, CA 95131, 408/262-6660, 800/222-6032. Micro Data File $6, Micro Disk Minder $8.95, Micro Flip Pak $2.

MindWrite
Version 1.0. MindWork Software, P.O. Box 222280, Carmel, CA 93922, 408/625-2720, 800/367-4334, 800/654-5599. 512K minimum memory; external drive recommended. $99.95.*

MockTerminal
Version 4.3. Shareware. CE Software, 801 73rd St., Des Moines, IA 50312, 515/224-1995. 128K minimum memory; requires modem; 512K or Mac Plus recommended. Bundled in *MockPackage Plus.* $35.*

Moose Frazer
Version 1.0. Public domain software by Jan Eugenides. 512K minimum memory; requires MacinTalk on the same disk.

Moose Phrases
See Talking Moose.

NewsNet
NewsNet, 945 Haverford Rd., Bryn Mawr, PA 19010, 215/527-8030, 800/345-1301. Requires modem. Subscription fees are $15 per month, $75 for 6 months, $120 per year; rates vary, depending on publication being accessed, time of day, and baud rate.

Oasis
Public domain software by Jan Eugenides, also available from P.O. Box 151, Maynard, MA 01754.

Office Productivity System (OPS)
Version 1.30. Applied Micronetics, Inc., 3 Burnt Oak Circle, Lafayette, CA 94549, 415/283-4498. 512K minimum memory; requires external drive; Mac Plus and hard disk recommended. $475.

Pak Ups
Computer Cover Co., P.O. Box 3080, Laguna Hills, CA 92654, 714/380-0085, 800/235-5330. Holds up to eight 3½-inch disks. $9.95; two for $16.95.*

PC-380 Bar Code Reader
TPS Electronics, 4047 Transport St., Palo Alto, CA 94303, 415/856-6833. 128K minimum memory. $795.*

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CompuCover, P.O. Box 310, Mary Esther, FL 32569, 904/243-5793, 800/874-6391 (orders only). $9.95.

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Innovative Technologies/Communications, 5649 La Jolla Blvd., La Jolla, CA 92037, 619/456-0722, 800/525-2226. $13.95.

The Print Shop
Version 1.0. Brøderbund Software, Inc., 17 Paul Dr., San Rafael, CA 94903, 415/479-1185. Key-disk copy protection. 512K minimum memory; requires printer. $79.95.*

Project Billing
Version 1.17. Satori Software, 2815 Second Ave. #590, Seattle, WA 98121, 206/443-0765. Key-disk copy protection. 512K minimum memory. $695.*

ProModem
Prometheus Products, Inc., 4545 Cushing Pkwy., Fremont, CA 94538, 415/490-2370. Model 1200 $349, 1200G $249, 2400 $499, 2400G $399.

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Red Ryder
Shareware; also available from Free-Soft Co., 10828 Lacklink, St. Louis, MO 63114, 314/523-2190. 512K minimum memory. $40.

ResEdit
Version 1.01. APDA, 290 S.W. 43rd St., Renton, WA 98055, 206/251-6548. 128K minimum memory. Bundled with Macintosh Development Utilities (M.D.U.). For members only. $25.

ScreenMaker
Version 1.0. Public domain software by Bill Atkinson. 128K minimum memory.

Smartcom II
Version 2.2. Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, GA 30348, 404/441-1617. 128K minimum memory, 512K to use interactive graphics feature; requires modem. $149.

Smartmodem
Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, GA 30348, 404/441-1617. 300 baud $199, 1200 baud $599, 2400 baud $899.

Sound Init
Public domain software by Fractal Software. 512K minimum memory; speaker recommended.

The Source
Source Telecomputing Corp., 1616 Anderson Rd., McLean, VA 22102, 703/734-7500, 800/336-3330. Requires modem. $49.95 one-time fee; rates for prime time (7 a.m. to 6 p.m. M-F): 300 baud 36 cents per minute, 1200 baud 43 cents per minute, 2400 baud 46 cents per minute; standard time (6 p.m. to 7 a.m. M-F, weekends, and holidays); 300 baud 14 cents per minute, 1200 baud 18 cents per minute, 2400 baud 20 cents per minute; $10 monthly minimum.

Talking Keys
Shareware by Brady Graham. 512K minimum memory. $15.

Talking Moose, Moose Phrases
Public domain software by Steve Halls. 512K minimum memory; requires MacinTalk on same disk.

TermWorks
Version 1.29. Shareware by James Rhodes; available from James Rhodes, 401 Eastwood, Lufkin, TX 75901. 128K minimum memory; requires Hayes-compatible modem; 512K or Mac Plus recommended. $20.*

Thunder
Version 1.01. Batteries Included, 30 Mural St., Richmond Hill, Ontario, Canada L4B 1B5, 416/881-9941, 800/387-5707. 512K minimum memory; Mac Plus recommended. $49.95.*

TimeWand Barcode System
Videx, Inc., 1105 N.E. Circle Blvd., Corvallis, OR 97330, 503/758-0521. 512K minimum memory; requires at least an 800K drive. Prices range from $646 to $886, depending upon software and size of TimeWand.*

TOPS
Version September 11. Centram Systems West, Inc., 2560 Ninth St. #220, Berkeley, CA 94710, 415/549-5900. 512K minimum memory; requires AppleTalk network; at least one hard disk recommended. $149 per Macintosh, $389 per PC.

Traveller Series
MicroStore, P.O. Box 37, St. Peter, MN 67082, 304/292-8424, 800/962-8885. Traveller-4 $7.95, Traveller-8 $11.95, Traveller-12 $13.95.

Turbo Pascal
Version 1.0. Borland International, 4585 Scotts Valley Dr., Scotts Valley, CA 95066, 408/438-8400, 800/742-1133. 512K minimum memory; hard disk recommended. $99.95.*

Typewriter
Public domain software by Fractal Software.

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Call: 1-800-MAC-DISK In Texas: 1-800-2MAC-TEX Tech Info: 512-473-8393
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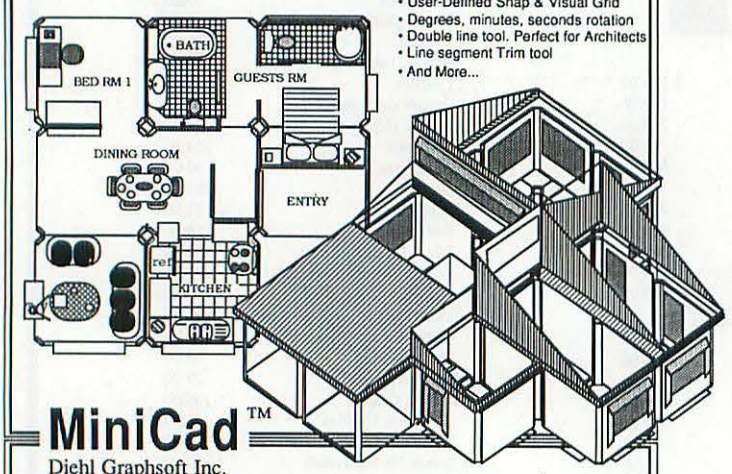
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Products for New Macs

For more information about the products mentioned in "Filling the Slots," contact the companies directly.

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Apple Computer
408/996-1010
AST Research, Inc.
714/863-1333
Autodesk, Inc.
415/332-2344, 800/445-5415
Avatar Technology, Inc.
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503/626-2291, 800/547-3303 (orders only)
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415/851-3272
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408/281-4100
Cricket Software
215/387-7955, 800/345-8112
Datacopy Corp.
415/965-7900, 800/821-2898
Datadesk International, Inc.
818/780-1673, 800/826-5398, 800/592-9602 in California
Dayna Communications, Inc.
801/531-0600, 800/531-0600
DCC Systems
714/632-3902
Dest Corp.
408/946-7100
Dove Computer Corp.
919/763-7918
Dreams of the Phoenix, Inc.
904/396-6952
Eicon Technology Corp.
514/333-8543
E-Machines, Inc.
503/692-6656
Eurosoft International, Inc.
408/741-0739
General Computer Corp.
617/492-5500, 800/634-9737, 800/854-9737 in Illinois
Hayes Microcomputer Products, Inc.
404/449-8791
IOmega Corp.
801/778-1000
Kinetics Inc.
415/947-0998
Levco
619/457-2011
Living Videotext, Inc.
415/964-6300, 800/443-4310 in California, 800/822-3700
LoDown
408/438-7400
Lutzky Baird Associates
213/649-3570
MacMemory, Inc.
408/922-0140, 800/862-2636
Matrix Instruments, Inc.
914/365-0190, 800/431-4466
MDIdeas, Inc.
415/573-0580
Micro CAD/CAM, Inc.
818/376-6831
Micrographic Images Corp.
818/407-0571
Microtek
213/321-2121, 800/654-4160
Mirror Technologies, Inc.
612/426-3276
Opcode Systems
415/321-8977
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404/564-5800
Radius, Inc.
408/732-1010
Reach Technologies, Inc.
512/280-1977, 800/523-8392
Rodime, Inc.
216/765-8414
Steve Jasik
415/322-1386
Southworth Music Systems, Inc.
617/772-9471
SuperMac Technology
415/964-8884
Tecmar, Inc.
216/349-0600
Think Technologies, Inc.
617/863-5590
3Com Corp.
415/961-9602
Touch Communications, Inc.
408/438-4800
Tri-Data
415/969-3700
Univation, Inc.
408/263-1200, 800/221-5842
Visual Information, Inc.
818/918-8834
Western Computer, Inc.
714/553-1611
Whisper Microcomputer Products, Inc. 512/329-0303
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d. Engineering or scientific
e. Professional
f. Reseller/VAR
g. Self-employed
h. Other

2. Number of employees in your company:
1. 25 or fewer
2. 26-99
3. 100-499
4. 500-999
5. 1000 or more

3. Plan to buy:
a. Now
b. In 4-6 months
c. In 7-12 months
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4. For how many personal computers do you buy products? (Include both company and personal units, please.)
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13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48
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61	62	63	64	65	66	67	68	69	70	71	72
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85	86	87	88	89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104	105	106	107	108
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121	122	123	124	125	126	127	128	129	130	131	132
133	134	135	136	137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152	153	154	155	156
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37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60
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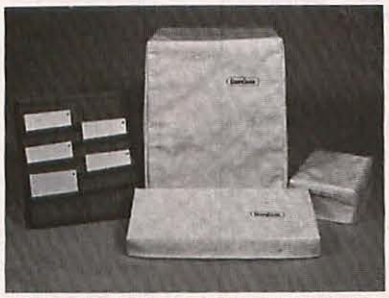
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Advertiser Index

Reader Service Number		Reader Service Number		Reader Service Number	
463	AST Research, 8-9	284	New Canaan Microcode, 194	655	Solutions, Inc., 84
552	Adobe Systems, 112	575	Orange Micro, 197	255	Sony, 114
274	Affinity Microsystems Ltd., 236	547	Owl Int'l, 30	225	StatSoft, 192
306	Aldus Corp., 28	45	PC Network, 58-59	666	StateWide, 235
665	Anco, 237	450	Panamax, 229	618	Sun Remarketing, 240
204	Ann Arbor, 18-19	553	Peachtree Software, 204	—	SuperMac Technology, 49, 51
—	Anthro Corp., 6	—	Performance Electronics, 234	332	T/Maker Co., 118
—	Apple Computer, Inc., 22-23	304	Peripherals Computers & Supplies, 194	461	Tangent Technologies, 184
21	BASF, 99	223	Personal Computer Peripherals Corp., 195	660	Target Software, 10-11
627	Bering, 46	560	Personal Training Systems, 208	663	Target Software, 120
578	Bible Research Systems, 190	631	Precision Data Products, 190	659	Target Software, 39
588	Blyth Software, 56-57	656	Princeton Graphics, 189	643	Think Technologies, 7
381	Borland Int'l., IFC-1	77	ProVUE Development Corp., 38	671	Think Technologies, 71
38	Bravo Technologies, Inc., 212	194	Programs Plus, 76-77	167	Thunderware, 182
657	CMS Enhancements, Inc., 33	334	Public Domain Exchange, 234	51	Tri-Data, 81
—	CasadyWare, 60	577	Radius, 15	469	True Basic, 79
669	Casey's Page Mill, 190	630	SBT, 221	483	Tussey, 82
607	Central Point Software, 74-75	576	SMS, 214	—	U.S. Disk, 230
524	Centram, 62-63	635	STSC, 94	134	USA Flex, 54
571	Century Software, 196	—	Satori Software, 110	537	Uptime, 5
650	Clearview Software, 64	—	ScanCoFurn, 106	591	Value Line Software, 179
619	Cognition Technology, 107	649	SearchLink, 80	670	VersaSoft, 219
636	Compu-Teach, 186	641	Sequoia mb, 236	459	Vision Technologies, 237
496	CompuCover, 239	266	Silicon Beach, 183, 185	439	Warp Nine Engineering, 36-37
330	CompuServe, 213	198	Simon & Schuster Software, 178	538	White Pine Software, 218
271	Computer Friends, 48	640	Softstyle, 217	374	Williams & Macias, 216
548	Computer Shoppe, 239	—	Software Library, 90		
620	ComputerCover Co., 222	582	Solutions, Inc., 84		
611	Coral Software, 200				
384	Cricket Software, 42-43				
584	DCC Systems, 210				
615	DEST, 83				
662	Data Tailor, 198				
281	DataViz, 202				
637	Datacopy, 201				
634	Diehl Graphsoft, 238				
562	Diskette Connection, 232				
498	Dove, 203				
69	Dow Jones Software, 50				
600	E-Machines, 108				
602	Ehman Engineering, 181				
403	Enabling Technologies, 180				
651	Enzan Software, 98				
579	1st Aid Software, 180				
552	1st Desk Systems, 237				
144	Forethought, 176				
603	GDT Softworks, 238				
—	GE Information Services, 73				
143	General Computer, 40-41				
520	Greene Johnson, 60				
530	I/O Design, 102				
272	Icon Review, 86-89				
208	Ideaform, Inc., 194				
249	Infosphere, IBC				
570	Jasmine Computer Systems, 100-101				
11	Kensington, 20				
658	Kroy Sign Systems, 91				
664	LaserWare, Inc., 72				
238	Layered, Inc., 52-53				
652	Letraset, 65-70				
493	Levco, 188				
—	Living Videotext, 12, 16-17				
466	LoDown, 193				
654	Logic Array, 211				
601	Lundeen, 233				
—	MacConnection, 122-125				
395	MacDoctor Electronics, 78				
1	MacMemory, 34-35				
368	MacRentals, 55				
16	MacStore, 229				
653	Macropak Int'l., 209				
596	Meta Software, 74				
409	Micro Planning Software, 116				
235	Micrographic Images, 103				
—	Microsoft, 104-105				
—	Microsoft, 92-93				
—	Microsoft, 95				
—	Microsoft, 96-97				
518	Mindwork, 44-45				
406	Mirror Technologies, 25, 26-27, 29				
668	Nat'l Computer Consulting, Inc., 192				

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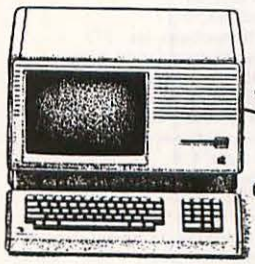
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Product Index

Reader Service Number

Software

Business

579 1st Aid Software, 180
552 1st Desk Systems, 237
306 Aldus Corp., 28
381 Borland Int'l., IFC-1
38 Bravo Technologies, Inc., 212
650 Clearview Software, 64
619 Cognition Technology, 107
548 Computer Shoppe, 239
384 Cricket Software, 42-43
69 Dow Jones Software, 50
144 Forethought, 176
249 Infosphere, IBC
664 LaserWare, Inc., 72
238 Layered, Inc., 52-53
— Living Videotext, 12, 16-17
653 Macropak Int'l., 209
409 Micro Planning Software, 116
— Microsoft, 96-97
— Microsoft, 104-105
547 Owl Int'l, 30
553 Peachtree Software, 204
560 Personal Training Systems, 208
630 SBT, 221
— Satori Software, 110
655 Solutions, Inc., 84
582 Solutions, Inc., 84
225 StatSoft, 192
591 Value Line Software, 179
670 VersaSoft, 219

Vertical

409 Micro Planning Software, 116
— Satori Software, 110

Data Management

552 1st Desk Systems, 237
588 Blyth Software, 56-57
381 Borland Int'l., IFC-1
662 Data Tailor, 198
144 Forethought, 176
653 Macropak Int'l., 209
77 ProVUE Development Corp., 38
576 SMS, 214
670 VersaSoft, 219

Word Processing

204 Ann Arbor, 18-19
520 Greene Johnson, 60
601 Lundeen, 233
— Microsoft, 92-93
— Microsoft, 95
518 Mindwork, 44-45
332 T/Maker Co., 118

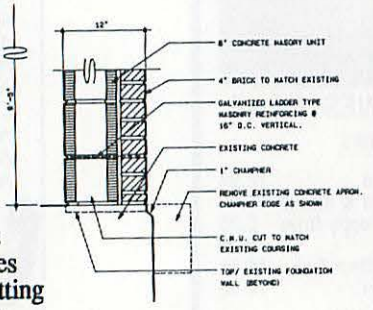
Communications

552 1st Desk Systems, 237
524 Centram, 62-63
281 DataViz, 202
249 Infosphere, IBC
304 Peripherals Computers & Supplies, 194
334 Public Domain Exchange, 234
649 SearchLink, 80
640 Softstyle, 217

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Reader Service Number

461 Tangent Technologies, 184
51 Tri-Data, 81
538 White Pine Software, 218

Educational

578 Bible Research Systems, 190
636 Compu-Teach, 186
560 Personal Training Systems, 208
225 StatSoft, 192

Graphics/Desktop Publishing

552 Adobe Systems, 112
274 Affinity Microsystems Ltd., 236
306 Aldus Corp., 28
— CasadyWare, 60
669 Casey's Page Mill, 190
571 Century Software, 196
650 Clearview Software, 64
548 Computer Shoppe, 239
384 Cricket Software, 42-43
403 Enabling Technologies, 180
651 Enzan Software, 98
664 LaserWare, Inc., 72
652 Letraset, 65-70
— Living Videotext, 12, 16-17
596 Meta Software, 74
575 Orange Micro, 197
547 Owl Int'l, 30
334 Public Domain Exchange, 234
266 Silicon Beach, 183
640 Softstyle, 217
582 Solutions, Inc., 84
655 Solutions, Inc., 84
660 Target Software, 10-11
671 Think Technologies, 71
374 Williams & Macias, 216

Desktop Engineering

634 Diehl Graphsoft, 238
576 SMS, 214

Personal Business/Home

664 LaserWare, Inc., 72
518 Mindwork, 44-45
547 Owl Int'l, 30
198 Simon & Schuster Software, 178
374 Williams & Macias, 216

Entertainment

266 Silicon Beach, 185

Language/Development Systems

635 STSC, 94
611 Coral Software, 200
643 Think Technologies, 7
469 True Basic, 79

Utilities

579 1st Aid Software, 180
607 Central Point Software, 74-75
653 Macropak Int'l., 209
640 Softstyle, 217
655 Solutions, Inc., 84
582 Solutions, Inc., 84
663 Target Software, 120

Miscellaneous

306 Aldus Corp., 28
330 CompuServe, 213
403 Enabling Technologies, 180
603 GDT Softworks, 238
— GE Information Services, 73
208 Ideaform, Inc., 194
284 New Canaan Microcode, 194
560 Personal Training Systems, 208
334 Public Domain Exchange, 234
576 SMS, 214
— Satori Software, 110
659 Target Software, 39
537 Uptime, 5
374 Williams & Macias, 216

Hardware

Boards 1

MacMemory, 34-35

Computer Systems

— Apple Computer, Inc., 22-23

Reader Service Number

Digitizers/Scanners

463 AST Research, 8-9
615 DEST, 83
637 Datacopy, 201
466 LoDown, 193
656 Princeton Graphics, 189
167 Thunderware, 182

Display

271 Computer Friends, 48
600 E-Machines, 108
235 Micrographic Images, 103
577 Radius, 15

Modems

271 Computer Friends, 48
450 Panamax, 229

Hard Disks/Storage

463 AST Research, 8-9
627 Bering, 46
657 CMS Enhancements, Inc., 33
584 DCC Systems, 210
602 Ehman Engineering, 181
143 General Computer, 40-41
570 Jasmine Computer Systems, 100-101
493 Levco, 188
466 LoDown, 193
654 Logic Array, 211
406 Mirror Technologies, 25, 26-27, 29
223 Personal Computer Peripherals Corp., 195
666 StateWide, 235
— SuperMac Technology, 49, 51
439 Warp Nine Engineering, 36-37

Miscellaneous

665 Anco, 237
607 Central Point Software, 74-75
271 Computer Friends, 48
498 Dove, 203
603 GDT Softworks, 238
395 MacDoctor Electronics, 78
— Performance Electronics, 234
— ScanCoFurn, 106
618 Sun Remarketing, 240

Accessories

Floppy Disks/Holders

21 BASF, 99
562 Diskette Connection, 232
255 Sony, 114

Miscellaneous

— Anthro Corp., 6
496 CompuCover, 239
620 ComputerCover Co., 222
530 I/O Design, 102
11 Kensington, 20
658 Kroy Sign Systems, 91
668 Nat'l Computer Consulting, Inc., 192
450 Panamax, 229
631 Precision Data Products, 190
— ScanCoFurn, 106

Mail Order

272 Icon Review, 86-89
— MacConnection, 122-125
368 MacRentals, 55
16 MacStore, 229
668 Nat'l Computer Consulting, Inc., 192
45 PC Network, 58-59
194 Programs Plus, 76-77
641 Sequoia mb, 236
— Software Library, 90
618 Sun Remarketing, 240
483 Tussey, 82
— U.S. Disk, 230
134 USA Flex, 54
459 Vision Technologies, 237



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14	3	3	**Microsoft Excel** *Microsoft*
10	4	4	**PageMaker** *Aldus*
5	6	5	**FullPaint** *Ann Arbor Softworks*
6*	5	6	**MacWrite** *Apple Computer*
19	8	7	**MacDraw** *Apple Computer*
6*	7	8	**MacPaint** *Apple Computer*
1	–	9	**SuperPaint** *Silicon Beach Software*
1	–	10	**MacLightning** *Target Software*

Education Software

6	1	1	**Kids' Time** *Great Wave Software*
6	2	2	**Math Blaster** *Davidson and Associates*
2	3	3	**KidTalk** *First Byte*
5	4	4	**MacEdge II** *Think Educational Software*
6	5	5	**Typing Tutor III** *Simon and Schuster Computer Software*

Entertainment Software

6	1	1	**Flight Simulator** *Microsoft*
6	2	2	**MacGolf** *Practical Computer Applications*
2	5	3	**Dark Castle** *Silicon Beach*
3	4	4	**The Ancient Art of War** *Brøderbund Software*
4	–	5	**Gato** *Spectrum Holobyte*

Networking/Data Communications

6	1	1	**AppleTalk** *Apple Computer*
6	2	2	**MacServe** *Infosphere*
6	3	3	**Apple Personal Modem** *Apple Computer*
2	4	4	**TOPS** *3Com*
13	–	5	**MacTerminal** *Apple Computer*

Hard Disk Drives

Months on chart	Last month	This month	
5	1	1	**Apple Hard Disk 20** *Apple Computer*
2	2	2	**Apple HD-20SC** *Apple Computer*
6	5	3	**DataFrame 20** *SuperMac Technology*
1	–	4	**MacBottom 20** *Personal Computer Peripherals Corporation*
3	4	5	**FX-20** *General Computer*

Books

6	1	1	**Excel in Business** *Douglas Cobb, Microsoft Press*
5	2	2	**The Apple Macintosh Book** *Cary Lu, Microsoft Press*
5	–	3	**Inside Macintosh** *Addison-Wesley*
6	4	4	**The Printed Word** *David A. Kater and Richard L. Kater, Microsoft Press*
1	–	5	**Microsoft Excel with Macros** *Douglas Hergert, Microsoft Press*

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Other recent products of particular interest.

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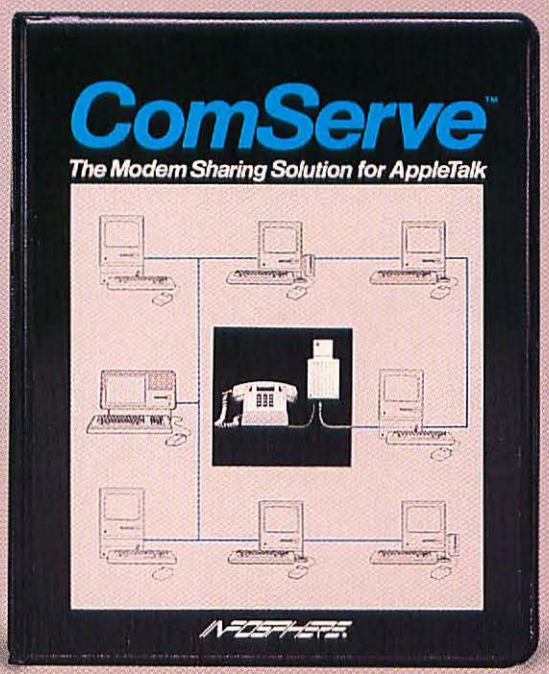
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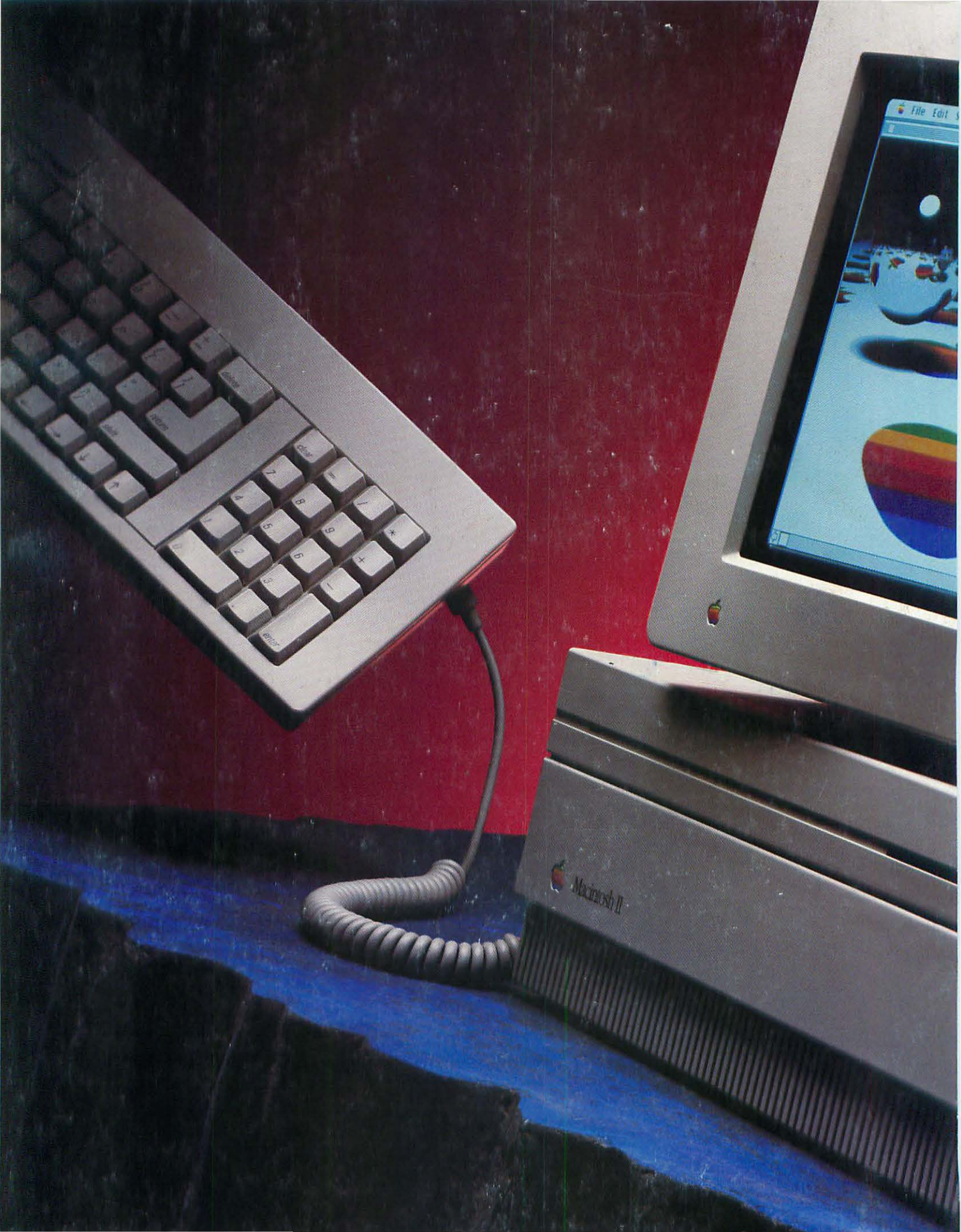
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